

South Dakota State University

Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

SDSU Extension Circulars

SDSU Extension

2-1972

1972 South Dakota Insecticide Recommendations

Cooperative Extension South Dakota State University

Follow this and additional works at: https://openprairie.sdstate.edu/extension_circ

Recommended Citation

South Dakota State University, Cooperative Extension, "1972 South Dakota Insecticide Recommendations" (1972). *SDSU Extension Circulars*. 856.

https://openprairie.sdstate.edu/extension_circ/856

This Circular is brought to you for free and open access by the SDSU Extension at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in SDSU Extension Circulars by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



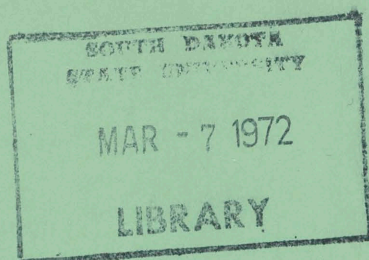
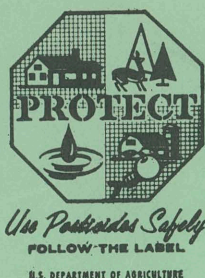
For current policies and practices, contact SDSU Extension

Website: extension.sdstate.edu

Phone: 605-688-4792

Email: sdsu.extension@sdstate.edu

SDSU Extension is an equal opportunity provider and employer in accordance with the nondiscrimination policies of South Dakota State University, the South Dakota Board of Regents and the United States Department of Agriculture.



1972 South Dakota

Insecticide Recommendations

(These recommendations NOT for use AFTER 1972)



Greenbug control research Southeast South Dakota Experiment Farm

Persons using treatments described herein assume full responsibility for using them in accordance with current label directions of the manufacturer. Be sure to read the complete label before using any pesticide.

STOP

Read, Understand,
and Follow Labels

COOPERATIVE EXTENSION SERVICE



agriculture • 4-H • home economics

College of Agriculture and Biological Sciences • South Dakota State University • Brookings, South Dakota 57006

Dear Client:

This insecticide handbook is designed to be used as a guide for responsible persons making insect control recommendations. We have selected insecticides for controlling various insect problems that occur in South Dakota on the basis of efficacy, cost, and relative safety. In all cases the safe use of these chemicals requires strict adherence to the precautions outlined on the label.

In addition to the insecticides listed in this handbook, other insecticides may have Federal and/or State registration for use. The lack of their inclusion in this handbook does not imply condemnation of said product; some of these were omitted because of cost, lack of availability, persistent residues, unnecessary hazard to the user, or lack of efficacy as compared to other insecticides.

Trade names have been used in this handbook for simplicity. The use of trade names neither implies discrimination against or endorsement of any product by the South Dakota Extension Service.

All pesticide labels are currently being reviewed by Federal agencies. Cancellation of certain pesticides and certain use labels will occur from time to time. In order to keep abreast of these changes, keep in touch with your local county agent or this office.

It is of extreme importance for users of this handbook to receive our Insect Newsletter published weekly throughout the growing season. When pesticide uses are cancelled and label approval withdrawn, you will be notified immediately via the Newsletter or direct mail.

If you are not receiving regular mailings of the Newsletter, you may do so by requesting placement on our mailing list at the Department of Entomology-Zoology at South Dakota State University.

B. H. Kantack
Extension Entomologist

Wayne L. Berndt
Extension Pesticide Specialist

/cjh

PESTICIDE RESIDUES

In 1954 Congress enacted the "Miller Bill" which is an amendment to the Federal Food, Drug and Cosmetic Act. This legislation provides for the establishment of tolerances of pesticide chemicals in or on raw agricultural commodities. Commodities such as fresh fruits and vegetables, meats, dairy products and food grains which are found to contain more than the established tolerances of specified chemicals are declared unfit for food and are seized. For some commodities and some chemicals the tolerance is zero; for example, any pesticide in milk. Other chemicals may be exempt from tolerances. The more recent "De-laney" amendment has established a zero tolerance in or on food products of all chemicals shown to be carcinogenic (cancer-producing).

In order to insure safety to the users of the chemicals and to further insure the health of the consumers of treated foods, all precautions and directions given in recommendations and on the labels of chemical containers should be followed carefully. You, whose responsibility it is to advise farmers and growers and recommend the use of these chemicals, should take every opportunity to stress safe handling and proper use of pesticides. Never advise over-dosing and do not advise the use of a chemical for a job for which it is not recommended. No one can absolutely guarantee that the tolerance will not be exceeded if the chemicals are used as recommended in this publication. However, we have so far as possible, checked these recommendations with label approvals and available research information so that you may be reasonably sure that excessive residues will not result when the recommendations are followed.

VERY IMPORTANT: Advise users to read and understand the label directions and then - use the chemicals on the crops or animals specified, in the amounts specified and at the times specified.

Should cases of accidental poisoning occur, direct contact can be made with:

South Dakota Poison Information Center
Vermillion, South Dakota
Telephone - 605-624-3432

Poison Control Center
McKenna Hospital
Sioux Falls, South Dakota
Telephone - 605-336-2320

The recommended time intervals between treatment and harvesting or grazing do not necessarily indicate the effective residual action of the insecticide against insects. These suggested intervals are those generally recognized as being adequate to prevent excessive residues on the treated crops or in the livestock utilizing the crops. The duration of the residual action of the chemicals against the insects being controlled will vary depending on temperature, rainfall, sunlight, amount of foliage, etc.

Section I ➡ 
Field Crop Insects

Section II ➡ 
Legume Insects

Section III ➡ 
Garden and Vegetable Insects


Section IV ➡ 
Pests of Man, Poultry and Livestock

Section V ➡ 
Stored Grain Insects

Section VI ➡ 
Household Insects

Section VII ➡ 
Small Fruit Insects

Section VIII ➡ 
Pests of Fruits

Section IX ➡ 
Pests of Shade Trees and Ornamentals

Section X ➡ 
Lawn Pests

Section XI ➡ 
Glossary

INTERPRETATION AND GUIDE FOR USE OF INSECTICIDES

The following recommendations include the applications of chemicals for the control of some of the important insect and mite pests. It should be kept in mind that the most effective and economical controls for many of these pests involve a complete program of cultural or mechanical as well as chemical operations. For more complete information on any one particular pest consult reference material such as text books, bulletins, circulars and fact sheets covering the specific problems.

Most of the recommendations for the use of insecticides are given in terms of pounds or ounces of actual toxicant per acre or as percent of actual toxicant in the finished spray. This is necessary because of the wide variety of insecticide formulations and of equipment for applying them. Insecticides are usually available as dusts, wettable powders, soluble powders, emulsifiable concentrates, granules or solutions. Each of these is designed for a specific method of application. For example, the dusts are formulated to be applied dry with dust guns or power dusters. The wettable powders are designed mainly for high gallonage pressure sprayers as used for spraying livestock. The emulsifiable concentrates, when diluted with water, form emulsions which may be used in low gallonage, low pressure sprayers. The job to be done and the equipment to be used will govern the type of formulation to recommend.

Actual Toxicant Per Acre

Most applications to cereal and forage crops are made in the form of dusts or as sprays using emulsifiable concentrates. With dusts it is relatively simple to determine the amount of dust to apply per acre. If the recommendations call for 2 pounds of actual insecticide per acre and a 5 per cent dust is used, then 40 pounds of the dust would have to be put on each acre to get 2 pounds of actual insecticide per acre.

When using emulsifiable concentrated read the label on the container to determine the amount of actual toxicant, or active ingredient, per gallon. Generally, for 25% concentrates there are 2 pounds of actual toxicant per gallon, for 45% concentrates there are 4 pounds of actual toxicant per gallon, etc. The following table may be used for determining the amount of material to use per acre. It is important to calibrate sprayers and dusters so that applications will be made accurately. This will insure effectiveness and will tend to avoid waste of chemicals and accumulations of possibly dangerous residues.

I N S E C T I C I D E D I L U T I O N T A B L E

Amounts of different formulations to use per acre to obtain the amounts of actual toxicant per acre indicated

Actual toxicant per acre desired	2 oz.	4 oz.	$\frac{1}{2}$ lb.	$\frac{3}{4}$ lb.	1 lb.	1 1/2 lbs.	2 lbs.	3 lbs.
<u>Formulation to be used:</u>								
15% wettable powder	13 oz.	28 oz.	3 1/3 lbs.	5 lbs.	6.5 lbs.	9.8 lbs.	13 lbs.	20 lbs.
25% wettable powder	$\frac{1}{2}$ lb.	1 lb.	2 lbs.	3 lbs.	4 lbs.	6 lbs.	8 lbs.	12 lbs.
40% wettable powder	5 oz.	10 oz.	1 1/4 lbs.	1 3/4 lbs	2 $\frac{1}{2}$ lbs.	3.8 lbs.	5 lbs.	7 $\frac{1}{2}$ lbs.
50% wettable powder	1/4 lb.	$\frac{1}{2}$ lb.	1 lb.	1 $\frac{1}{2}$ lbs.	2 lbs.	3 lbs.	4 lbs.	6 lbs.
75% wettable powder	3 oz.	6 oz.	2/3 lb.	1 lb.	1 1/3 lb.	2 lbs.	2 2/3 lb	4 lbs.
10-12% emulsifiable concentrate (1 lb. per gallon)	1 pt.	1 qt.	2 qts.	3 qts.	1 gal.	1 $\frac{1}{2}$ gal.	2 gal.	3 gals.
18-19% emulsifiable concentrate (1 $\frac{1}{2}$ lb. per gallon)	0.6 pt.	1.3 pt.	2.6 pt.	4.0 pt.	5.3 pt.	8.0 pt.	10.6 pt.	2 gals
25% emulsifiable concentrate (2 lb. per gallon)	$\frac{1}{2}$ pt.	1 pt.	1 qt.	3 pts.	$\frac{1}{2}$ gal.	3 qts.	1 gal.	1 $\frac{1}{2}$ gals
40-45% emulsifiable concentrate (4 lb. per gallon)	$\frac{1}{4}$ pt.	$\frac{1}{2}$ pt.	1 pt.	1 $\frac{1}{2}$ pt.	1 qt.	3 pt.	$\frac{1}{2}$ gal	3/4 gal
50-55% emulsifiable concentrate (5 lb. per gallon)	1/5 pt.	2/5 pt.	4/5 pt.	1 $\frac{1}{4}$ pt.	1 2/3 pt.	2 $\frac{1}{2}$ pts.	2/5 gal	4.8 pts
60-70% emulsifiable concentrate (6 lb. per gallon)	1/6 pt.	1/3 pt.	2/3 pt.	1 pt.	1 1/3 pt.	2 pts.	2 2/3 pt.	4 pts.
70-80% emulsifiable concentrate (8 lb. per gallon)	1/8 pt.	1/4 pt.	$\frac{1}{2}$ pt.	3/4 pt.	1 pt.	1 $\frac{1}{2}$ pts.	2 pts.	3 pts.
5% dust	2 $\frac{1}{2}$ lbs.	5 lbs.	10 lbs.	15 lbs.	20 lbs.	30 lbs.	40 lbs.	60 lbs.
10% dust	1 $\frac{1}{4}$ lbs.	2 $\frac{1}{2}$ lbs.	5 lbs.	7 $\frac{1}{2}$ lbs.	10 lbs.	15 lbs.	20 lbs.	30 lbs.

TO CALCULATE PERCENT OF FINISHED SPRAYS

Recommendations for spraying livestock and buildings are often given as per cent of finished spray or as a recipe, such as 8 pounds 50% wettable powder per 100 gallons of water. It is often desirable to be able to obtain the same strength spray using a different formulation or smaller amounts of water. The following formulas are useful in making these calculations:

1. To figure the per cent actual toxicant in a spray mixture:

$$\frac{\text{Pounds of insecticide used} \times \% \text{ active ingredient in insecticide}}{\text{gallons of spray mixture} \times 8. \text{ (approx. weight of 1 gal. water)}}$$

EXAMPLE: 8 lbs. 50% CoRal wettable powder were mixed in 100 gallons of water. What per cent actual CoRal was in the spray?

$$\frac{8 \times 50}{100 \times 8} = 0.5\% \text{ actual CoRal}$$

2. To figure the pounds of wettable powder needed to mix a spray containing a given per cent of actual toxicant:

$$\frac{\text{Gallons of spray wanted} \times \% \text{ actual toxicant wanted} \times 8}{\% \text{ active ingredient in insecticide used}}$$

EXAMPLE: How many pounds of 25% malathion wettable powder are needed to make 100 gallons of spray containing 1% malathion?

$$\frac{100 \times 1 \times 8}{25} = 32 \text{ pounds}$$

3. To figure the gallons of emulsifiable concentrate needed to mix a spray containing a given percentage of active ingredient:

$$\frac{\text{Gallons of spray wanted} \times \% \text{ active ingredient wanted} \times 8}{\text{lbs. active ingredient per gallon in insecticide used} \times 100}$$

EXAMPLE: How much 25% emulsifiable concentrate (2 lbs. per gal.) is needed to make 50 gallons of spray containing 0.25% actual ingredient?

$$\frac{50 \times 0.25 \times 8}{2 \times 100} = 1/2 \text{ gallon}$$

Reducing to One Gallon of Spray

Often it may be necessary to reduce the spray recommendations for 100 gallons to a one gallon basis for small jobs. For wettable powders use one level tablespoon in one gallon for each pound per 100 gallons. For example, if a recommendation called for 4 pounds of 50% wettable powder per 100 gallons and only one gallon of spray is needed, use 4 level tablespoons per gallon.

With emulsifiable concentrates use one teaspoon per gallon as the equivalent of one pint per 100 gallons. For example, if the recommendation is one gallon of 25% emulsifiable concentrate per 100 gallons and only one gallon of spray is wanted use 8 teaspoons of the concentrate per gallon of water (1 gal. = 8 pts.).

DILUTION TABLE

INSECTICIDE CONCENTRATE	To approximately get the indicated percentage of insecticide, use the amount of concentrate given in the top figure in enough water to make 100 gallons, or the amount shown in the lower figure in 1 gallon water						
	0.125%	0.25%	0.5%	1%	2%	3%	5%
10%-12% Emulsion Concentrate (Con- taining one lb. chemical per gal.)	1 gal. (8 tsp.)	2 gal. (16 tsp.)	4 gal. (10 tbsp.)	8 gal. (2/3 pt.)	16 gal. (1-1/3 pt.)	24 gal. (1 qt.)	40 gal. (3-1/4 pt.)
15%-20% Emulsion Concentrate (Con- taining 1-1/2 lbs. chemical per gal.)	6 pt. (6 tsp.)	1-1/2 gal. (12 tsp.)	3 gal. (7-1/2 tbsp.)	6 gal. (1/2 pt.)	12 gal. 1 pt.)	18 gal. (1-1/2 pt.)	30 gal. (2-1/2 pt.)
25% Emulsion Con- centrate (Con- taining 2 lbs. chemical per gal.)	4 pt. (4 tsp.)	1 gal. (8 tsp.)	2 gal. (5 tbsp.)	4 gal. (10 tbsp.)	8 gal. (2/3 pt.)	12 gal. (1 pt.)	20 gal. (1-3/4 pt.)
33%-35% Emulsion Concentrate (Con- taining 3 lbs. chemical per gal.)	3 pt. (3 tsp.)	6 pt. (6 tsp.)	1-1/2 gal. (4 tbsp.)	3 gal. (8 tbsp.)	6 gal. (1/2 pt.)	9 gal. (3/4 pt.)	15 gal. (1-1/3 pt.)
40%-50% Emulsion Concentrate (Con- taining 4 lbs. chemical per gal.)	2 pt. (2 tsp.)	4 pt. (4 tsp.)	1 gal. (8 tsp.)	2 gal. (5 tbsp.)	4 gal. (10 tbsp.)	6 gal. (1/2 pt.)	10 gal. (4/5 pt.)
50%-58% Emulsion Concentrate (Con- taining 5 lbs. chemical per gal.)	1-3/4 pt. (1-1/4 tsp.)	3-1/2 pt. (3-1/2 tsp.)	7 pt. (7 tsp.)	5 qts. (4-1/2 tbsp.)	3-1/2 gal. (9 tbsp.)	5-1/4 gal. (14 tbsp.)	8-3/4 gal. (1-1/2 cups)
60%-65% Emulsion Concentrate (Con- taining 6 lbs. chemical per gal.)	1-1/2 pt. (1/2 tbsp.)	3 pt. (1 tbsp.)	6 pt. (2 tbsp.)	1-1/2 gal. (4 tbsp.)	3 gal. (8 tbsp.)	4-1/2 gal. (12 tbsp.)	7-1/2 gal. (2/3 pt.)
70%-75% Emulsion Concentrate (Con- taining 8 lbs. Chemical per gal.)	1 pt. (1 tsp.)	2 pt. (2 tsp.)	4 pt. (4 tsp.)	1 gal. (8 tsp.)	2 gal. (5 tbsp.)	3 gal. (7-1/2 tbsp.)	5 gal. (13 tbsp.)
15% Wettable Powder	6-2/3 lb. (10 tsp.)	13-1/3 lb. (7 tbsp.)	26-2/3 lb. (1 cup)	53-1/3 lb. (2 cups)	106-2/3 lb. (4 cups)	160 lb. (6 cups)	266-2/3 lb. (10 cups)
25% Wettable Powder	4 lb. (6 tsp.)	8 lb. (12 tsp.)	16 lb. (8 tbsp.)	32 lb. (1 cup)	64 lb. (2 cups)	96 lb. (3 cups)	160 lb. (5 cups)
40% Wettable Powder	2-1/2 lb. (4 tsp.)	5 lb. (8 tsp.)	10 lb. (5 tbsp.)	20 lb. (10 tbsp.)	40 lb. (1-1/4 cups)	60 lb. (2 cups)	100 lb. (3-1/4 cups)
50% Wettable Powder	2 lb. (3 tsp.)	4 lb. (6 tsp.)	8 lb. (4 tbsp.)	16 lb. (8 tbsp.)	32 lb. (1 cup)	48 lb. (1-1/2 cups)	80 lb. (2-1/2 cups)
75% Wettable Powder	1-1/3 lb. (2 tsp.)	2-2/3 lb. (4 tsp.)	5-1/3 lb. (8 tsp.)	10-2/3 lb. (5 tbsp.)	21-1/3 lb. (10 tbsp.)	32 lb. (1 cup)	53-1/3 lb. (2 cups)

HARD WATER RAPIDLY BREAKS DOWN ORGANOPHOSPHORUS AND CARBAMATE INSECTICIDES

A few examples of this breakdown are: Malathion, an organic phosphate insecticide, rapidly hydrolyzes above a pH of 7 and Sevin, a carbamate, rapidly hydrolyzes above pH of 9. Parathion, another organic phosphate insecticide, rapidly hydrolyzes above pH of 9.

The rate of hydrolysis is of course dependent on temperature and other factors. The higher the temperature the faster the rate of decomposition. Once an insecticide breaks down, the killing power is usually reduced. Hydrolysis often occurs in a very short time in an alkaline solution. To counteract alkalinity, add one to two teaspoons of vinegar per gallon of water. (Example: for pH of 7.5-8.0 add one teaspoon of vinegar per gallon) Unsoftened well water varies in the degree of hardness. Vinegar can be added to make such water slightly acid (below pH 7). You can determine the pH of your water supply by using a soil testing kit or ask the city department for this information.

TABLE OF EQUIVALENTS

3 level teaspoons = 1 level tablespoon

2 level tablespoons - 1 fluid ounce

16 level tablespoons = 1 cup or 8 fluid ounces

2 cups = 1 pint

1 pint = 16 fluid ounces

2 pints = 1 quart

4 quarts = 1 gallon

16 ounces = 1 pound

1 gallon of water weighs 8.345 lbs. (at 39.2°F.)

PROCEDURE FOR CALIBRATING FIELD SPRAYERS
(Information from Entoma, 12th Edition)

1. Measure out a forty rod distance (660 feet).
2. Determine time in minutes and seconds to travel this distance with sprayer using speed which will be used for spraying. Start tractor moving about 25 feet before starting point of run so tractor has come to a steady speed at the starting point.
3. After the time period for traveling the 40 rods has been determined, operate sprayer while stationary for the same period of time and catch the discharge from any four nozzles. Pour this discharge together and measure in gallons, quarts or pints.
4. Determine from the following tables the gallons sprayed per acre. Use Table I. for general coverage spraying and Table II for row crop spraying. (Add together for fractional parts of a gallon; for example, if you used 2 gallons and 1 pint, add together the figures for 2 gallons and the figures for 1 pint from the tables.)

Table I. General Field Crop Spraying

Total Amount Caught 4 Nozzles	Nozzle Spacing (in inches)					
	10	15	18	19	20	22
	Gallons Per Acre					
1/2 pint	1.24	.82	.68	.65	.62	.56
1 pint	2.47	1.65	1.4	1.3	1.2	1.1
1 quart	4.9	3.3	2.7	2.6	2.5	2.2
2 quarts	9.9	6.6	5.5	5.2	5.0	4.5
3 quarts	14.8	9.9	8.2	7.8	7.4	6.7
1 gallon	19.8	13.2	11.0	10.4	9.9	9.0
2 gallons	39.6	26.4	22.0	20.8	19.8	18.0
3 gallons	59.4	39.6	33.0	31.2	29.7	27.0
4 gallons	79.2	52.8	44.0	41.6	39.6	36.0
5 gallons	99.0	66.0	55.0	52.0	49.5	45.0
6 gallons	118.8	79.2	66.0	62.4	59.4	54.0
7 gallons	-	92.4	77.0	72.8	69.3	63.0
8 gallons	-	105.6	88.0	83.2	79.2	72.0
9 gallons	-	118.8	99.0	93.6	89.1	81.0
10 gallons	-	-	110.0	104.0	99.0	90.0

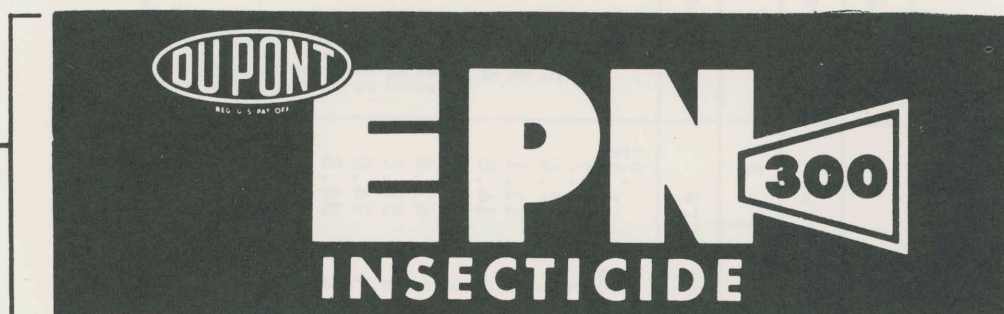
TABLE II. ROW CROP SPRAYING

Total quantity caught from any four nozzles	36" rows			38" rows			40" rows			42" rows		
	Nozzles per row			Nozzles per row			Nozzles per row			Nozzles per row		
	1	2	3	1	2	3	1	2	3	1	2	3
	Gallons per acre			Gallons per acre			Gallons per acre			Gallons per acre		
$\frac{1}{2}$ pint	.34	.69	1.03	.32	.65	.97	.31	.62	.92	.29	.59	.88
1 pint	.69	1.37	2.06	.65	1.3	1.95	.62	1.23	1.85	.59	1.17	1.76
1 quart	1.4	2.7	4.1	1.3	2.6	3.9	1.2	2.5	3.7	1.2	2.4	3.5
2 quarts	2.7	5.5	8.2	2.6	5.2	7.8	2.5	4.9	7.4	2.3	4.7	7.0
3 quarts	4.1	8.2	12.3	3.9	7.8	11.7	3.7	7.4	11.1	3.5	7.1	10.6
1 gallon	5.5	11.0	16.5	5.2	10.4	15.6	4.95	9.9	14.8	4.7	9.4	14.1
2 gallons	11.0	22.0	33.0	10.4	20.8	31.2	9.9	19.8	29.6	9.4	18.8	28.2
3 gallons	16.5	33.0	49.5	15.6	31.2	46.8	14.8	29.7	43.4	14.1	28.2	42.3
4 gallons	22.0	44.0	66.0	20.8	41.6	62.4	19.8	39.6	59.2	18.8	37.6	56.4
5 gallons	27.5	55.0	82.5	26.0	52.0	78.0	24.8	49.5	74.0	23.5	47.0	70.5
6 gallons	33.0	66.0	99.0	31.2	62.4	93.6	29.7	59.4	88.8	28.2	56.4	84.6
7 gallons	38.5	77.0	-	36.4	72.8	-	34.6	69.3	-	32.9	65.8	98.7
8 gallons	44.0	88.0	-	41.6	83.2	-	39.6	79.2	-	37.6	75.2	-
9 gallons	49.5	99.0	-	46.8	93.6	-	44.6	89.1	-	42.3	84.6	-
10 gallons	55.0	110.0	-	52.0	-	-	49.5	99.0	-	47.0	94.0	-

A LABEL IS A TOOL -

KEY POINTS TO LOOK FOR

Product Name



WETTABLE POWDER

Ingredient Statement

ACTIVE INGREDIENT:

Ethyl p-Nitrophenyl Thionobenzenephosphonate 25%

INERT INGREDIENTS 75%

U. S. PAT. 2,503,390



POISON



ANTIDOTES

Antidote Statement

INTERNAL—Give a tablespoonful of salt in a glass of warm water and repeat until vomit fluid is clear. Have victim lie down and keep quiet. CALL A PHYSICIAN IMMEDIATELY.

EXTERNAL—Immediately remove all contaminated clothing and wash skin thoroughly with soap and warm water.

NOTE TO ATTENDING PHYSICIAN—*Repeated therapeutic doses of atropine may be effective. Do not use morphine.*

SEE ADDITIONAL CAUTIONARY INFORMATION ON OPPOSITE PANEL

What The Product Does

Du Pont EPN 300 Insecticide is a wettable powder recommended for spray application to control certain plant mites and insects.

EPN 300 Insecticide controls certain mites or insects on apples (except McIntosh and related varieties), pears, peaches, prunes, plums, grapes, cherries, almonds, walnuts, pecans, olives, citrus, corn, beans, tomatoes and onions.

STORE IN A COOL DRY PLACE

NET 3 LBS.

Manufacturer Formulator

MANUFACTURED FOR

E. I. DU PONT DE NEMOURS & Co. (Inc.)

GRASSELLI CHEMICALS DEPARTMENT

WILMINGTON, DELAWARE

THE MOST IMPORTANT 4 MINUTES IN PEST CONTROL

LEARN HOW TO USE IT!

SUGGESTIONS FOR USE

Except where noted, figures indicate pounds of EPN 300 Insecticide per 100 spray gallons (as applied by high-pressure hydraulic equipment). When using other types of equipment, adjust the concentration to apply the proper amount of EPN 300 Insecticide per acre.

Use sufficient volume of spray to thoroughly cover all plant surfaces. Mix the required amount of EPN 300 Insecticide with a small quantity of water and then add to tank with agitator running when nearly full or through the screen while filling with water.

Treatments should begin with the first cover spray following bloom (of fruits) or with the first signs of infestation. Apply one spray and re-treat as necessary. Spray programs require accurate timing of multiple applications; for details, consult local, State or Federal authorities for specific use information.

MITE CONTROL: (Red spider, European red, Pacific, two-spotted, Willamette and Schoene) on pears, apples, plums, peaches, cherries, grapes, pecans, walnuts, and almonds—EPN 300 Insecticide is generally effective when applied at $\frac{1}{2}$ to $\frac{3}{4}$ lb. For citrus red mite on citrus, use 2 lbs. (8-12 lbs. per acre). For two-spotted mite on beans and tomatoes, and russet mite on tomatoes, use $\frac{1}{2}$ lb.

INSECT CONTROL: Stone Fruits—Plum curculio, Oriental fruit moth, use 1 to 1 $\frac{1}{2}$ lbs.; peach tree borer and lesser peach tree borer, 1 $\frac{1}{4}$ to 3 lbs.; Lecanium scale (crawlers) and peach cottony scale (crawlers), 1 $\frac{1}{4}$ lbs.; olive scale crawlers, 1 lb. plus 1.5% light medium oil or 2 $\frac{1}{2}$ lbs. alone; fruit tree leafroller (cherries) and budmoth (prunes), $\frac{3}{4}$ lb.

Apples and Pears—Plum curculio, 1 to 1 $\frac{1}{2}$ lbs.; codling moth, 1 lb.; fruit tree leafroller, $\frac{3}{4}$ lb.; pear psylla, $\frac{1}{2}$ lb.

Walnuts—Codling moth, walnut aphid, 1 lb.; fruit tree leafroller, $\frac{3}{4}$ lb.

Other deciduous fruits and nuts—Grape berry moth, 1 lb.; pecan nut casebearer, 1 $\frac{1}{2}$ lbs.

Citrus Fruits—Orangeworms, 5 to 6 lbs. per acre; citrus thrips, 6 to 8 lbs. per acre—outside coverage; fruit tree leafroller and orange tortrix, 3 to 9 lbs. per acre.

Tomatoes—Leaf miners (Serpentine and certain other species), potato aphid, Southern armyworm and tomato fruitworm, $\frac{1}{2}$ to 1 lb. at 7- to 10-day intervals as needed.

Other Vegetable and Field Crops—Mexican bean beetle and onion thrips, $\frac{1}{2}$ to 1 lb.; European corn borer, 1 lb.—make 2 to 4 applications beginning 5 to 7 days after eggs are laid.

IMPORTANT

Keep animals and unprotected persons away during treatment and while there is danger from drift or residues. For dust application, use a commercially prepared dust mixture. Do not apply during bloom (of fruits) or later than the following number of days prior to picking, cutting, harvesting, or using: Olives—no later than July 15; citrus—30 days; corn—14 days; other fruits, nuts and vegetables—21 days.

Do not use on McIntosh and related varieties of apples. Do not use on green onions for fresh market. Treated citrus rind must not be used for food purposes. Promptly destroy empty containers by burning or burying.

DANGER! Extremely hazardous if swallowed, inhaled or absorbed through skin. Rapidly absorbed through skin.

Keep out of reach of children

Do not get in eyes, on skin, on clothing. Do not breathe fumes, dust or spray mist. Wear natural rubber gloves, protective clothing, and goggles when applying or handling. Wear an effective mask or respirator of a type passed by U.S.D.A. for combined dust and organic vapor. . . . Do not contaminate feed or foodstuffs.

Wash hands, arms, and face thoroughly with soap and warm water before eating or smoking. In case of contact, immediately remove all contaminated clothing and wash skin with soap and warm water; for eyes, flush with water for 15 minutes and get medical attention. Wash all contaminated clothing with soap and warm water before re-use.

SEE ANTIDOTES ON OPPOSITE PANEL

COMPATIBILITY—EPN 300 Insecticide is compatible with most other insecticides and fungicides; specifically, liquid lime-sulfur, BHC, lindane, DDT, sulfur, methoxychlor, nicotine, naphthalenacetic acid, and the mercurial and dithiocarbamate fungicides. Do not use EPN 300 Insecticide in combination with Bordeaux or zinc sulfate-lime sprays.

NOTICE TO BUYER—SELLER makes no warranty of any kind, express or implied, concerning the use of this product. BUYER assumes all risk of use or handling whether in accordance with directions or not.

Directions
For Use

Pests
Controlled

&

Dosages

Crops
Protected

Waiting Period
To Harvest &
Timing

Special Precautionary
Statements

Storage
Precautions

IS THE TIME YOU TAKE TO READ THE LABEL

Section I
Field Crop Insects



INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Aphids, Green- bugs, English grain aphid	Small grains	<u>Note:</u> Control measures are recommended on greenbug when 40 - 50 aphids are present per row foot. The minimum economic infestation justifying treatment with English grain aphids is 50 aphids per head and visible damage.		
		Parathion (Ethyl)	8 ozs./A., aerial application in 2 gals. water or, 1 gal. diesel fuel	<u>Commercial applicators only.</u> Do not apply Ethyl Parathion within 15 days of harvest. Do not apply Ethyl Parathion to rye.
		<u>Note:</u> Temperatures following application of Parathion need to exceed 50 degrees F. for at least two hours for this treatment to be effective. Treated fields should not be entered for five days.		
		Malathion	1 lb./A.	Do not apply Malathion within 7 days of harvest on wheat, oats, rye and barley. <u>Malathion should not be used when temperatures are below 60°F.</u> as low temperatures reduce its effectiveness.
		Di-Syston	6 - 8 ozs./A.	<u>Commercial applicators only.</u> Foliar application as a spray or in liquid fertilizer as a top dressing in the spring or fall. Use lower rates on plants up to tillering. Higher rates should be used after plants have tillered.
		<u>Note:</u> Di-Syston is much more effective than other insecticides at extremely low temperatures, 35 - 50 degrees F.; this insecticide should be used in situations where lower temperatures prevail.		

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Armyworms Treat when number of worms exceed 5 per square foot or economic damage is evident.	Small grains	Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 15 days.
		Malathion	1 1/2 lbs./A.	Do not harvest for 7 days.
		Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter. No restrictions on use of grain.
		Thiodan	8 ozs./A.	Do not apply after heads begin to form. Do not feed treated forage to dairy animals or animals being finished for slaughter. Follow the label on operator safety for prolonged usage.
		Dylox	1 lb./A.	Do not harvest for grain for 21 days. Do not forage or feed within 3 days after treatment.
Treat when 10% of plants are infested. Use higher rates for large worms.	Corn	Carbaryl (Sevin)	1 1/2 lbs./A.	No waiting period.
		Gardona	1 - 1 1/2 lbs./A.	No limitation for grains, 5 days for forage.
		Malathion	1 1/2 lbs./A.	Do not harvest for 5 days.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 12 days.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Armyworms (cont.)	Corn (cont.)	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter. No limitation on use of grain.
		Dylox	1 lb./A.	Do not harvest for 28 days.
	Flax	Dylox	1 lb./A.	Do not harvest for 21 days.
Blister beetle	Potato	Carbaryl (Sevin)	1 lb./A.	Foliage application only.
Colorado potato beetle	Potato	Carbaryl (Sevin) (sprayable or flowable)	1 lb./A.	Treat when beetle larvae are observed, continue on a 10 - 14 day schedule for the rest of the season.
		Endosulfan (Thiodan)	12 ozs./A.	No time limitation. Follow the label on operator safety for prolonged usage.
		Guthion E.C.	8 ozs./A.	<u>Commercial applicators only.</u> Do not apply within 7 days of harvest
		Phosphamidon	1 lb./A.	<u>Commercial applicators only.</u> Do not harvest for 7 days.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Common stalk borer	Corn	No chemical control recommended; thorough weed control in field and field borders will help alleviate or reduce infestations.		
Corn earworm	Sweet corn	Carbaryl (Sevin)	1 1/2 lbs./A.	No limitations.
Use at least 25 gallons of spray per acre. Direct sprays at ear zone every four days during silking until silks dry up. May be used up to day of harvest; stalks can be fed to both beef and dairy cattle. Earworm control on field corn is not considered economical or practical.		Gardona	1 lb./A.	Do not apply within 5 days for feeding or forage.
Corn leaf aphids (seed fields only, chemical control of corn leaf aphid is usually not necessary or economically feasible on non-seed fields)	Corn	Malathion	1 lb./A.	Do not harvest for 5 days.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest or cut for forage for 12 days.
Greenbug	Sorghum FOLIAR SPRAYS	Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 12 days. (Do not spray Methyl Parathion or mixtures of Ethyl and Methyl Parathion on sorghum as plant injury may occur.)

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Greenbug (cont.)	Sorghum FOLIAR SPRAYS (cont.)	Di-Syston	8 ozs./A.	<u>Commercial applicators only.</u> Do not apply more than twice per season. Do not apply within 7 days of harvest of grain or 28 days of use as forage or fodder.
	Sorghum GROUND SPRAYERS ONLY - Malathion and Diazinon have not always given satisfactory control when applied by air.	<u>1</u> Diazinon	8 ozs./A.	Do not apply within 7 days of harvest for grain. Crop may be fed immediately.
		Malathion	1 lb./A.	Do not harvest for 7 days.
	Sorghum PLANTING-TIME TREATMENT	Di-Syston	1 lb./A.	Apply 6.5 lbs. 15G or 10 lbs. 10G in a 4 inch band above the seed at planting, incorporate 1/2 to 1 inch ahead of packer wheels or covering wheels. Do not apply directly on seed and do not apply Di-Syston granules more than once per crop season. (Based on 40 inch row spacings.) Follow label instructions.

1 Use based on South Dakota research test as Diazinon has received federal registration for sorghum but is not specifically registered for greenbug control.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Greenbug (cont.)	Sorghum GRANULE POST- PLANTING WHORL APPLICATIONS	Di-Syston	1 lb./A.	6.5 lbs. 15G or 10 lbs. of 10% granules per acre based on 40 inch row spacing. Apply by broadcasting specified dosage in the whorl. Do not apply within 30 days of harvest for grain or 14 days of harvest for forage or fodder. Do not apply Di-Syston more than once per season.
	Sorghum	Phorate (Thimet)	1 lb./A.	Apply 10 lbs. of 10% granules topically by air or ground equipment. Do not apply within 28 days of harvest.
Corn root aphids	Corn	Where problems exist the use of a systemic insecticide such as Thimet or Furadan as used for rootworm control are suggested.		
Corn rootworm	Corn	See fact sheet for detailed recommendations.		
		Bux	1 lb. (10 lbs. 10% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incorporate lightly. Do not place in contact with seed.
		Phorate (Thimet)	1 lb. (10 lbs. 10% granules or 6.5 lbs. 15% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incorporate lightly. Do not place in contact with seed.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Corn rootworm (cont.)	Corn (cont.)	Dyfonate	1 lb. (5 lbs. 20% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incor- porate lightly. Do not place in contact with seed.
		Dasanit	1 lb. (6.5 lbs. 15% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incor- porate lightly. Do not place in contact with seed.
		Carbofuran (Furadan)	0.75 lbs. (7.5 lbs. 10% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incor- porate lightly. Do not place in contact with seed.
		Prophos (Mocap) (Jolt)	1 lb. (10 lbs. 10% granules or 6.5 lbs. 15% granules)/ A.	Apply at planting time in a 4 - 7 inch band over the row and incor- porate lightly. Do not place in contact with seed.
		**Diazinon	1 lb. (7 lbs. 14% granules)/A.	Apply at planting time in a 4 - 7 inch band over the row and incor- porate lightly. Do not place in contact with seed.
		<p>Note: **Diazinon is not recommended for corn rootworm control south of U.S. Highway 16, in South Dakota. Recommended on later plantings north of Highway 16.</p> <p>Apply all treatments as a row treatment in a 4-7 inch band, incorporated in the upper half inch of the soil. Carefully calibrate equipment to give correct dosages.</p>		

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Corn rootworm adults	Corn	Malathion	1 lb./A.	Do not apply within 5 days of harvest.
Control measures should be taken only when the silks are being damaged to the extent that proper pollination will not occur. Control measures should be taken before the silks are damaged to the extent that less than one-half inch of silk is protruding from the top of the ear and while viable pollen is available in the field. Treatments should be applied when 25 percent of the field is in silk.		Carbaryl (Sevin)	1 lb./A.	No waiting period.
		Parathion (Ethyl)	4 ozs./A.	<u>Commercial applicators only.</u> Do not apply within 12 days of harvest.
		EPN	4 ozs./A.	<u>Commercial applicators only.</u> Do not apply within 14 days of harvest.
		Malathion (ULV concentrate)	4 ozs./A.	Do not apply within 5 days of harvest.
Cutworms	Corn	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed toxaphene treated forage to dairy animals or animals being finished for slaughter.
<u>Apply all treatments at first sign of damage when plants are small in a 12 inch band over the row and cultivate into a shallow depth.</u>		Carbaryl (Sevin)	2 lbs./A.	No time limitations.
		Dylox	1 lb./A.	One application per season when plants are 3 - 12 inches high. Spray lower portions of plants and soil around base. Do not use corn for food, feed or ensilage within 28 days of treatment.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cutworms (cont.) For early spring season control of army cutworms on small grain, Endrin gives faster and better control than Toxaphene. Endrin is the only insecticide registered by the USDA that will control pale western cutworm.	Small grains	Endrin	4 ozs./A.	<u>Commercial applicators only.</u> Single application. Do not treat within 45 days of harvest. Do not feed forage to dairy animals or animals being finished for slaughter. No restrictions on use of grain.
		Toxaphene	1 1/2 - 2 lbs./A.	Do not feed forage to dairy animals or animals being finished for slaughter. No restrictions on use of grain. Use higher rates on larger worms.
European corn borer For first brood, treat when 50% of the plants show shot-hole injury in whorl leaves (or 7 - 10 days after hatch when corn is at least 35 inches extended height). For second brood, apply to ear zone when the average egg mass count reaches 100 per 100 plants. <u>Treatment for second brood is seldom justified except on seed producing fields.</u>	Corn	Carbaryl (Sevin)	1 1/2 lbs./A. (30 lbs. 5% granules/A.)	No waiting period. Forage can be fed to beef or dairy animals.
		Diazinon	7 - 10 lbs. of 14% granules/A.	Corn may be picked immediately; corn forage may be fed to dairy and beef cattle and sheep.
		EPN	4 ozs./A.	<u>Commercial applicators only.</u> Do not use within 14 days of harvest or feeding.
		<u>Bacillus thuringiensis</u>	as labelled	No time limitations. No restrictions on grain or ensiling of treated crops.
		Toxaphene	2 lbs./A.	As granules. Do not feed forage to dairy animals or animals being finished for slaughter. No restrictions on use of grain.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
European corn borer (cont.)	Corn (cont.)	Thimet 15G	1 lb./A.	6.5 lbs./A. (40 inch rows) or 8 ozs. of granules per 1000 feet of row for narrower spacings. Do not apply within 30 days of grazing or cutting for forage.
		Parathion (Ethyl)	8 ozs./A.	Apply as labelled. <u>Commercial applicators only</u> . Do not harvest for 12 days.
Grasshopper Treat when over 8 per square foot and/or economic damage is occurring.	Small grains	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter. No limitation on use of grain.
		Malathion	1 lb./A.	Do not harvest for 7 days.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only</u> . Do not harvest for 15 days.
		Malathion (ultra low-volume concentrate)	8 fl. ozs./A.	<u>Commercial applicators only</u> . Do not harvest for 7 days.
	Winter wheat (field border treatment)	Thimet	1 lb./A. (based on 7" spacings)	Apply at planting time in seed furrow with granular applicator or grass seeder attachment. Do not graze treated wheat.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Grasshopper (cont.)	Corn	Carbaryl (Sevin)	1 1/2 - 2 lbs./A.	No time limitation.
		Malathion	1 lb./A.	Do not harvest for 5 days.
		Malathion (ultra low- volume con- centrate)	8 fl. ozs./A.	<u>Aerial applicators only.</u> Do not harvest for 5 days.
		Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy cattle or animals being finished for slaughter. No limit- ation on use of grain. Use for border treatments to prevent migra- tion of grasshoppers into fields.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 12 days.
	Sorghum	Carbaryl (Sevin)	1 1/2 lbs./A.	No time limitation on corn or sor- ghum grown for forage. Do not apply on sorghum grown for grain within 21 days of harvest.
		Toxaphene (grain sorghum only)	1 1/2 - 2 lbs./A.	Do not graze toxaphene treated for- age with dairy animals or animals being finished for slaughter. Do not ensile treated forage. Do not apply more than once after heads start to form. Do not harvest with- in 28 days.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Grasshopper (cont.)	Sorghum (cont.)	Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 12 days.
		(Caution: Do not spray Methyl Parathion or mixtures of Ethyl and Methyl Parathion on sorghum as plant injury may occur.)		
Potato insect complex	Potato	Thimet 10G or 15G	3 lbs./A.	Apply 30 lbs. of 10% granules or 20 lbs. of 15% granules with granular applicator or can be applied with fertilizer at planting. Follow all label precautions since these compounds are very toxic. <u>Commercial producers only.</u> Note: Do not apply Thimet within 90 days or Di-Syston within 75 days of harvest.
		Di-Syston	3 lbs./A.	
Seed corn beetles, maggots, and light infestations of wireworms, etc.	Corn and Sorghum	Aldrin	1 oz./Bu. as a seed treatment	As directed on the package for seed treatment. Do not store treated seed. Plant as soon as possible.
		Heptachlor	1 oz./Bu. as a seed treatment	(See above instructions).
		Lindane	1 oz./Bu. as a seed treatment	(See above instructions).
		Diazinon	2 ozs./Bu. as a seed treatment	(See above instructions).

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Sunflower moth	Sunflower	Endosulfan (Thiodan)	1 lb./A.	Do not apply more than 3 times per season. Do not feed forage to livestock.
		Parathion (Methyl)	1 lb./A.	<u>Commercial applicators only.</u> Make no more than 3 applications at 5 day intervals. Do not apply within 30 days of harvest.
Wheat jointworm straw worm stem maggot stem sawfly	Wheat	No chemical treatment recommended. Cultural practices, such as straw removal etc. should be practiced. Resistant varieties should be used for sawfly control where possible.		
Wireworms	Corn	Aldrin	2 lbs./A.	<u>Aldrin approved for corn only.</u> Apply as broadcast treatment just before planting time. Work into soil by diskling. <u>Do not use Aldrin or Heptachlor on potato land.</u>
		Heptachlor	2 lbs./A.	
		Chlordane	4 lbs./A.	
		Diazinon	3 - 4 lbs./A.	As a preplant broadcast treatment. Disk into upper 4 - 8 inches of the soil.
		Dyfonate	4 lbs./A.	Preplant broadcast treatment. Disk into upper 4 - 8 inches of the soil.
	Small grains	Chlordane	4 lbs./A.	As broadcast treatment worked into the soil by diskling.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Wireworms (cont.)	Potatoes	Chlordane	5 lbs./A. broadcast, 2 1/2 - 3 lbs./A. in a band application	Disk into the soil prior to or at planting time. Apply as a band application to soil at planting time or after emergence - 2 1/2 - 3 lbs. per acre. Do not use within 30 days of harvest.
		Diazinon (commercial planting only)	3 - 4 lbs./A.	As a preplant broadcast treatment. Thoroughly disk in upper 4 - 8 inches of the soil.
		Dyfonate (commercial planting only)	4 lbs./A. (20 lbs. of 20% granules)	Apply as broadcast and incorporate into the soil by disking prior to planting.
		Thimet (commercial planting only)	3 lbs. (20 lbs. of 15% granules)/A.	Distribute the granules evenly in the furrow or granules may be banded on each side of the row at planting time. Follow all label precautions.
		Dasanit (commercial planting only)	5 lbs./A.	Apply broadcast and incorporate into the soil by disking prior to planting.

*In terms of actual toxicant per acre.

Section II
Legume Insects



INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Alfalfa seed chalcid	Alfalfa & sweet clover seed	No chemical control recommended. Plant recleaned seed, destroy cleanings. Keep volunteer alfalfa from blooming.		
Alfalfa weevil larvae	Alfalfa	Cultural Control.		Early cutting if possible. Re- growth should be carefully observed for signs of damage or retardation of growth before applying a spray.
	Alfalfa (bud stage) - first crop - where early cutting is not poss- ible)	Parathion (Methyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 15 days.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 15 days.
		Carbaryl (Sevin)	1 1/2 lbs./A.	No pre-harvest limitations.
		Imidan	1 lb./A.	Do not graze or cut within 7 days of application - do not apply over once per cutting.
		Diazinon	1 lb./A.	Do not harvest within 10 days of application.
		Guthion	12 ozs./A.	<u>Commercial applicators only.</u> Do not harvest within 21 days of application. Only one applications per cutting.
		Methoxychlor	1 1/2 lbs./A.	Do not harvest within 7 days of application.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Alfalfa weevil larvae (cont.)	Alfalfa (second crop stubble treatment)	<p>Note: Any of the above treatments will give good control on alfalfa stubble. In addition, malathion at the rate of 1 lb./A. will give satisfactory control when applied as a stubble treatment. There is no waiting interval before harvest for malathion.</p> <p>Combinations of diazinon + methoxychlor and malathion + methoxychlor are also registered for use.</p>		
Ant (harvester)	General	Mirex baits		Use according to label.
		Kepone baits		Use according to label. (See Mountain States regional publication #3., 1966), available through this office.
Blister beetles	Alfalfa seed crop	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy or animals being finished for slaughter.
Clover leafhoppers and other leafhoppers	Alfalfa, (seed crop only)	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter.
Crickets	Seed alfalfa	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed forage to dairy animals or animals being finished for slaughter.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cutworms	Alfalfa	Dylox (Trichlorfon)	1 lb./A.	Apply when worms are active. Do not harvest for 14 days. Do not apply more than once per cutting.
		Parathion (Ethyl or Methyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest within 15 days of application.
		Phosdrin (Mevinphos)	6 ozs./A.	<u>Commercial applicators only.</u> Do not harvest within 1 day of application.
False chinch bug	Seed alfalfa	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed forage to dairy animals or animals being finished for slaughter.
Flea beetles	Alfalfa seed crop	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter.
Garden Webworm	Alfalfa	Carbaryl (Sevin)	1 1/2 lbs./A.	No harvest limitation. Do not use on seed crop.
		Dylox (Trichlorfon)	1 lb./A.	Do not harvest within 14 days of application. Do not apply more than once per cutting.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Grasshopper	Alfalfa, clover forage and seed	Malathion	1 lb./A.	No time limitations.
		Carbaryl (Sevin)	1 1/2 lbs./A.	No time limitations. Do not use on seed crop.
		<u>1</u> Cygon (<u>Alfalfa only</u>)	4 ozs./A.	Do not apply more than once per season or within 28 days of harvest.
		Diazinon	1 lb./A.	Do not graze livestock within 2 days or cut for hay within 10 days of application. Do not spray alfalfa in bloom.
		Guthion	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 16 days.
		Dibrom (Naled)	1 lb./A.	Do not apply within 4 days of cutting for hay.
		Parathion (Ethyl or Methyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 15 days.
		Malathion (ULV)	8 fl. ozs./A.	Do not harvest for 7 days.
		Toxaphene (seed crop only)	2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter.

1. Based on South Dakota research test as Cygon is federally registered for the crop but not specifically for grasshoppers.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Grasshopper (cont.)	Soybeans	Carbaryl (Sevin)	1 1/2 lbs./A.	No time limitations.
		Malathion	1 lb./A.	Do not apply within 1 day of harvest.
		Malathion (ULV)	8 fl. ozs./A.	Do not harvest for 7 days.
		Toxaphene	2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter. No restrictions on threshed beans.
		Guthion	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 21 days.
		Parathion (Ethyl)	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 15 days.
Leaf-feeding, green cloverworm, thistle cater- pillar, army- worm etc.	Soybeans	Carbaryl (Sevin)	1 1/2 lbs./A.	No time limitations.
		Guthion	8 ozs./A.	<u>Commercial applicators only.</u> Do not harvest for 21 days.
		Toxaphene	1 1/2 lbs./A.	Do not feed treated forage to dairy animals or animals being finished for slaughter. No restrictions on threshed beans.

INSECT

CROP

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Lygus bugs and
other plant
bugs

Alfalfa, (seed
crop only)

Toxaphene

1 1/2 - 2 lbs./A.

Do not feed treated forage to
dairy animals or animals being
finished for slaughter.

Mites

Soybeans

Carbophenothion
(Trithion)

12 ozs./A.

Do not harvest for 7 days. Do
not feed treated forage to live-
stock. Experienced aerial appli-
cators only.

Parathion
(Ethyl)

8 ozs./A.

Do not harvest for 15 days. Exper-
enced aerial applicators only.

Pea aphid
and spotted
alfalfa aphid

Alfalfa, hay
or seed crop

Malathion

1 lb./A.

No time limitations.

Parathion
(Ethyl)

8 ozs./A.

Commercial applicators only. Do
not harvest for 15 days.

Di-Syston
granules

1 lb./A.

Apply as a broadcast treatment
as needed. Allow a minimum of 28
days between applications.

Guthion

8 ozs./A.

Commercial applicators only. Do
not harvest for 16 days.

Demeton

4 ozs./A.

Commercial applicators only. Do
not apply more than once per cutting.
Wait 21 days if forage is to be fed

Cygon

4 ozs./A.

Do not apply more than once per
season or within 28 days of harvest

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Pea aphid and spotted alfalfa aphid (cont.)	Alfalfa, hay or seed crop (cont.)	Dibrom (Naled)	1 lb./A.	Do not cut hay within 4 days after application.
		Diazinon	8 ozs./A.	May be grazed or feed green immediately. Do not cut for hay within 7 days after application.
Sweet clover weevil	Sweet clover	Toxaphene	1 1/2 - 2 lbs./A.	Do not feed forage to dairy animals or animals being finished for slaughter. Apply in early spring or after cutting before new growth is 4 inches tall.
Treat as soon as notching or feeding on seed- lings is evident.		Parathion (Ethyl)	8 ozs./A.	Do not harvest for 15 days. <u>Ethyl parathion recommended for exper- ienced aerial applicators only.</u>

*In terms of actual toxicant per acre.

NOTE, FOLLOWING PRECAUTIONS:

In all cases it is unlawful to sell or transport out-of state, hay that has been treated with any pesticide, unless the proper waiting periods and dosages have been used. Care should be taken to see that dairy animals are not fed on forage treated foliarly with Aldrin, Heptachlor, Chlordane, Dieldrin or other chlorinated hydrocarbon insecticides, as residues are likely to appear in milk, making this product subject to seizure and condemnation by the FDA. Meat animals being finished for slaughter may build-up residues inside their bodies, so care should be taken to never allow these animals to graze or feed upon forages that may have excessive pesticide residues. Read all directions on pesticide labels very carefully and follow all rules on the dosages and waiting periods.

If it becomes necessary to spray alfalfa fields for seed production, apply insecticides after 7:00 p.m. and before 7:00 a.m. to protect the local bee population. Notify the local beekeepers prior to applying the spray application.

Never - spray alfalfa fields in bloom.

Section III
Garden and Vegetable Insects



INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Armyworm	General	Carbaryl (Sevin)	1 1/2 lbs./A.	Follow all label precautions.
Asparagus beetle	Asparagus	Carbaryl (Sevin)	1 lb./A.	Do not treat within one day of harvest.
		Malathion	1 lb./A.	Do not treat within one day of harvest.
Bean weevil	Bean and pea	Cultural control important. Destroy crop residue, vines etc.		
		Methoxychlor	1 lb./A.	Do not harvest for 3 days for beans or 7 days for peas. Apply early bloom.
Blister beetle	General	Malathion	1 lb./A.	Do not harvest for 3 to 7 days, depending on crop to which applied.
		Carbaryl (Sevin)	1 lb./A.	Do not treat within one day of harvest.
Cabbage aphid	Cabbage	Malathion	1 lb./A.	At least 7 days before harvest.
Cabbage caterpillar	Cabbage	Malathion	1 lb./A.	At least 7 days before harvest.
Cabbage looper	Cabbage	Malathion	1 lb./A.	Do not harvest for 7 days.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cabbage maggot	Cabbage, turnip, radish, cauliflower, broccoli	Chlordane	1 lb./A.	Apply to ground and base of plants when set out or when seedlings first emerge using 1 lb./100 gallons of water. May also be applied to the soil and worked in before planting.
Colorado potato beetle	Potato	Carbaryl (Sevin)	1 lb./A.	No limitations.
Common stalk borer	Corn, tomato and potato	No chemical control recommended. Thorough weed control around garden will serve as a measure of cultural control.		
Corn earworm	Sweet corn	Carbaryl (Sevin)	1 1/2 lbs./A.	Use at least 25 gallons of spray per acre. Direct sprays at ear zone every 4 days during silking until silks dry up. May be used up to day of harvest; stalks can be fed to both beef and dairy cattle. Earworm control on field corn is not considered economical or practical.
Corn rootworm	Sweet corn	Rotate to avoid corn-on-corn. See field crop section for control of corn rootworm. (Bux, Dyfonate and Thimet are registered for use on sweet corn.)		
Cricket	General	Carbaryl (Sevin)	1 1/2 lbs./A.	Follow intervals between application and harvest as directed on the label.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cucumber beetle	Cucurbits	Carbaryl (Sevin)	1 lb./A.	No pre-harvest limitations.
		Malathion	1 lb./A.	One day interval before harvest.
		Methoxychlor	1 1/2 lbs./A.	Do not apply within 7 days of harvest.
Cutworm	General	Carbaryl (Sevin)	1 1/2 lbs./A.	Apply to soil surface at base of plant.
Flea beetle	Radish and other cru- cifera	Carbaryl (Sevin)	1 lb./A.	Do not harvest for 3 days.
Garden webworm	General	Malathion	1 lb./A.	Treat margins and all crops in- fested. Wait 3 - 7 days to har- vest as directed on the label for the crop involved.
Grasshopper	General	Carbaryl (Sevin)	1 1/2 lbs./A.	Apply to grassy margins or garden. Follow harvest intervals on label for vegetables involved.
Hornworm	Tomato	Carbaryl (Sevin)	1 1/2 lbs./A.	No time limitations.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Leafhopper	General	Malathion	1 lb./A.	Follow intervals as indicated on the label for the crop involved.
		Carbaryl (Sevin)	1 lb./A.	Follow intervals as indicated on the label for the crop involved.
		Methoxychlor	1 lb./A.	Follow intervals between treatment and harvest as indicated on the label for each crop involved.
Melon aphid	Cucurbits	Malathion	1 lb./A.	Do not harvest within 1 day of application.
Mexican bean beetle	Bean	Malathion	1 lb./A.	Wait at least 1 day after application to harvest.
		Carbaryl (Sevin)	1 lb./A.	No pre-harvest limitations.
		Methoxychlor	1 1/2 lbs./A.	Do not apply within 3 days of harvest.
Mites "Red spider"	Bean and cucurbits	Malathion	1 lb./A.	Do not apply within 1 day of harvest.
Onion maggot	Onion	Chlordane	1 lb./A. (1 lb./ 100 gals. water)	Apply to open furrow at planting time with sufficient water to drench seed furrow.

INSECTS	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Onion thrips	Green or dry onions	Malathion	12 ozs./A.	Wait 3 days to harvest
Pea aphid	Peas	Malathion	1 lb./A.	Wait at least 3 days to harvest.
Pickle worm	Cucumbers	Carbaryl (Sevin)	1 lb./A.	No pre-harvest time limitations.
		Methoxychlor	1 lb./A.	Do not apply within 7 days of harvest.
Plant bug	General	Malathion	1 lb./A.	Observe all label restrictions.
		Carbaryl (Sevin)	1 1/2 lbs./A.	Follow intervals between application and harvest as directed by label.
Potato aphid	Potato	Malathion	1 lb./A.	No time limitations.
Potato flea beetle	Potato	Carbaryl (Sevin)	1 lb./A.	No limitations on harvest.
Potato leaf-hopper	Potato	Carbaryl (Sevin)	1 lb./A.	Foliage applications only.
		Malathion	1 lb./A.	No time limitations.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Potato psyllid	Potato and tomato	Carbaryl (Sevin)	1 1/2 lbs./A.	No pre-harvest limitations.
		Malathion	1 lb./A.	No pre-harvest limitations on potatoes. Do not harvest tomatoes for 1 day.
Seed corn maggot	Beans	Chlordane	1 oz./Bu.	Use as seed treatment only, as directed on the label.
Slugs and snails	Non-food crops (flowers, ornamentals)	Metaldehyde baits	Baits mixed as follows: 1 oz. metaldehyde 2 ozs. calcium arsenate 2 lbs. bran or corn meal	These baits can be purchased locally. Follow all label precaution. Moisten the bait before spreading. Spread late in the evening at the rate of 1 lb./1000 square feet. <u>Follow all labe precautions.</u> Slug and snail numbers can be reduced by cleaning up infested areas. Remove stones, leaves and other debris that may serve as hiding places.
¹ Slugs	Garden area	Stale beer	Place beer in shallow pan so that pan is full	Bury the pan in the soil so that top of pan is at ground level. Remove slugs each morning.

¹ Not federally registered but has been shown to be effective.

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Squash bug	Cucurbits	Carbaryl (Sevin)	1 lb./A.	No pre-harvest limitations.
Stink bug	General	Carbaryl (Sevin)	1 lb./A.	Follow pre-harvest intervals on the label for the particular crop involved.
White grub	General	Chlordane	4 lbs./A.	Work thoroughly into the soil, 4 - 6 inches.
Wireworm	Potatoes	Chlordane	4 lbs./A.	Broadcast treatment only prior to or at planting time.
		Chlordane	2 1/2 - 3 lbs./A.	Band treatment.
		Thimet (for use in commercial plantings only)	3 lbs./A. (20 lbs. 15% granules)	Distribute the granules evenly in the furrow or granules may be banded on each side of row at planting time. Wait 90 days before harvesting potatoes. Commercial producers only.
		Diazinon (commercial planting only)	3 - 4 lbs./A. (21 - 28 lbs. 14% granules)	Broadcast treatment just prior to planting and work in soil 4 - 8 inches.
		Dyfonate (commercial planting only)	4 lbs./A.	Apply broadcast and incorporate into the soil by disking prior to planting.
		Dasanit (commercial planting only)	5 lbs./A.	Apply broadcast and incorporate into the soil by disking prior to planting.

*In terms of actual toxicant per acre.

For the average small farm or home garden the use of an "all purpose" dust or spray for garden pests and diseases will simplify the control of most of these pests. Such a preparation should contain a fungicide like captan or zineb and insecticides like malathion, carbaryl (Sevin) or methoxychlor. For special problems like wireworms, cabbage maggots, etc. the above recommendations should be given. Refer to the latest USDA Home and Garden publications. Potato insects are also listed under Field Crops, Section I.

Section IV
Pests of Man, Poultry and Livestock



INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Bed bug	Man	Chlordane	8 tbsps. 45% E.C. in 3 gallons of water	Follow all label instructions. Apply to bed frame, bedroom walls, and behind baseboards at the rate of 1 gal. per 1,000 square feet. When using sprays, the household oil base sprays are the best.
		Ronnel	1% 5 1/3 ozs. of 24% E.C./ gal. of water	Follow all label instructions. Apply to bed frame, bedroom walls, and behind baseboards. House- hold grade oil base sprays are the best.
		<u>Note:</u> Poultry houses are often a source of bed bug infestations in the home. Caution: Do not use Chlordane in poultry houses.		
Black fly	Man	Insect repellents offer temporary relief.		
	Livestock (see also <u>Mosquitoes</u> - <u>Adult Control</u>)	Synergized pyrethrins, or allethrins sprays may give temporary protection.		
Blow fly		Residual building sprays for <u>Housefly Control</u> may help control adult blow flies. Bury or burn all dead animal carcasses, as a sanitary measure it is of prime importance.		
Cat fleas	Cats	Pyrethrin preparations	Dusts	Use as directed on labels. Dust into hair thoroughly twice at 15 day intervals, also treat area <u>where cat sleeps</u> .
		Malathion	(4% dust) or 1 oz. of 57% E.C./gal. of water as spray	Repeat application in 7 days if necessary.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cat fleas (cont.)	Cats (cont.)	Carbaryl (Sevin)	5% dust	Do not treat kittens under 4 weeks of age.
		Vapona (DDVP)	Cat Collar	Follow all label instructions.
Cattle grub	BEEF CATTLE <u>ONLY</u>	<u>SPRAYS</u>		
(Apply sprays thoroughly with pressure above 250 lbs. per square inch. Use a pencil stream spray #5,6, or 7 nozzle disk. Hold nozzle from 4 - 5 feet from the animal. The addition of a small amount of detergent to the spray tank may help penetration.)		Co-Ral	12 lbs. of 25% W.P. to 100 gals. of water	No limitations for slaughter stock. Do not apply to lactating dairy animals or to dry dairy animals within 14 days of freshening.
		Co-Ral	25% W.P. 8 lbs./100 gals. of water	No limitations for slaughter stock. Do not apply to lactating dairy animals or to dry dairy animals within 14 days of freshening. Two applications are required at 3 month intervals.
		Imidan (Prolate)	0.25% spray treatment	Use about 1 gal. per animal. Do not apply within 21 days of slaughter. Do not treat dairy animals. Do not repeat for seven days.
		Neguvon	10 lbs. 80% S.P. to 100 gals. water	Do not apply within 14 days of slaughter; <u>do not spray dairy animals</u>
		Ruelene	1.5 gals. of 25% E.C. in 100 gals. of water. Use a maximum of 1 gal. per animal	Ruelene is not recommended for treatment after November 1. Do not apply within 28 days of slaughter or freshening.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cattle grub (cont.)	BEEF CATTLE <u>ONLY</u> (cont.)	<u>POUR-ONS</u>		
		Co-Ral	4% ready mixed pour-on 1/2 oz. per 100 lbs. body weight.	No waiting time until sale for slaughter. Do not treat dry cows within 14 days of freshening.
		Famphur (Warbex)	13.2% ready mixed pour-on 1 oz. per 200 lbs. body weight. As directed on label.	Use on beef cattle, dry dairy cows or heifers. Pour-on directed amount from shoulder to tailhead. Do not use within 21 days of calving or 35 days of sale for slaughter. Do not use on calves under 3 months old or animals stressed from dehorning, castration, illness, or over excite- ment.
		Imidan (Prolate)	4% in water as pour-on treatment.	See label for directions and pre- cautions. Apply 1 fl. oz. per 100 lbs. body weight, but not over 8 fl. ozs. per animal. Do not treat dairy animals.
		Neguvon	8% ready mixed pour-on 1/2 fl. oz. per 100 lbs. body weight.	Do not treat within 21 days of slaughter or 7 days of freshening.
		Ruelene	Mix 1 part 25% E.C. with 3 parts water. Pour-on 1 oz. of mix- ture per 100 lbs. body weight. No more than 8 ozs. per animal.	Do not treat after November 1. Do not apply within 28 days of slaughter.

Cattle grub
(cont.)BEEF CATTLE
ONLY (cont.)POUR-ONS
(cont.)

Ruelene

Ready to use
pour-on (9.4%)
3/4 oz. per 100
lbs. body weight
and no more than
8 ozs.Do not treat after November 1.
Do not apply within 28 days of
slaughter.Tiguvon
(Fenthion)3% ready to use
pour-on 1/2 oz.
per 100 lbs. body
weight.Do not treat if cattle are within
35 days of slaughter. Dry cows
should not be treated if within 28
days of calving.FEED MIXES AND
ADDITIVES

Ronnel

Use Ronnel (such as
Rid-Ezy, Trolene FM
in feed program,
following use direc-
tions on manufacture's
label.All cattle systemic grub treatments
should be given in late summer or
early fall, after the heel fly
season is over.Famphur
(Famix)Prepared feed mix
0.22%** 10-day
treatment for grubs.Feed to beef cattle, heifers or dry
cows only. Feed at rate of 1/4 lb.
per 100 lbs. body weight for 10 days
for grubs. Feed 1/8 lb. per 100
lbs. body weight for 30 days for
grubs and lice. Do not use after
November 1. Do not use within 21
days of calving or 4 days of slaughter.Famphur
(Famix)30-day treatment
for grubs and
SUCKING LICE

**Typical concentration - other concentrations available but are calculated to give animal proper dosage over treating period.

Cattle grub
(cont.)BEEF CATTLE
ONLY (cont.)POUR-ONS
(cont.)

Ruelene

Ready to use
pour-on (9.4%)
3/4 oz. per 100
lbs. body weight
and no more than
8 ozs.Do not treat after November 1.
Do not apply within 28 days of
slaughter.Tiguvon
(Fenthion)3% ready to use
pour-on 1/2 oz.
per 100 lbs. body
weight.Do not treat if cattle are within
35 days of slaughter. Dry cows
should not be treated if within 28
days of calving.FEED MIXES AND
ADDITIVES

Ronnel

Use Ronnel (such as
Rid-Ezy, Trolene FM
in feed program,
following use direc-
tions on manufacture's
label.All cattle systemic grub treatments
should be given in late summer or
early fall, after the heel fly
season is over.Famphur
(Famix)Prepared feed mix
0.22%** 10-day
treatment for grubs.Feed to beef cattle, heifers or dry
cows only. Feed at rate of 1/4 lb.
per 100 lbs. body weight for 10 days
for grubs. Feed 1/8 lb. per 100
lbs. body weight for 30 days for
grubs and lice. Do not use after
November 1. Do not use within 21
days of calving or 4 days of slaughter.Famphur
(Famix)30-day treatment
for grubs and
SUCKING LICE

**Typical concentration - other concentrations available but are calculated to give animal proper dosage over treating period.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cattle grub (cont.)	Dairy cattle	Older cows in milk production usually do not have economic infestations of cattle grubs, therefore treatment for lactating cows is not recommended. However, systemic grub treatments as listed under "Beef Cattle" are recommended for replacement heifers and dry cows provided they are beyond the specified waiting periods till calving.		
Cattle lice	Beef cattle	<u>SPRAYS</u>		
		Co-Ral	0.25% spray-2 lbs. of 25% W.P. to 25 gals. of water.	Use as directed on the label.
		Delnav (Dioxathion)	0.15% spray-1 qt. of 30% E.C. to 50 gals. water or 2 qts. 15% E.C. to 50 gals. water.	Do not repeat application within 2 weeks. Do not dip animals under 3 months of age.
		Ciodrin	1 qt. 2 lbs. E.C. to 6 gals. of water. 1 - 2 pts. spray per animal.	Do not repeat sooner than 7 days.
		Ciodrin	3% dry dust	Apply to animal by hand and rub into hair coat. Repeat in 3 - 4 weeks if necessary.
		Lindane	0.06% spray-2 pts. of 20% E.C. or 2 lbs. 25% W.P. to 100 gals. of water.	Do not spray within 30 days of slaughter, or dip within 60 days of slaughter.
		Malathion	0.5% spray-1 gal. of 57% E.C. or 16 lbs. of 25% W.P. to 100 gals. of water.	Be sure to follow all label precautions.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cattle lice (cont.)	Beef cattle (cont.)	<u>SPRAYS</u> (cont.)		
		Methoxychlor	0.5% spray-2 gals. 25% E.C. or 8 lbs. 50% W.P. to 100 gals. of water.	Be sure to follow all label precautions.
		Neguvon	2 1/2 lbs. of 80% soluble powder to 100 gals. of water.	Do not treat within 14 days of slaughter.
		Ronnel (Korlan)	0.25% spray-1 gal. 24% E.C. to 100 gals. of water.	No waiting time between treatment and sale for slaughter.
		Toxaphene	5 pts. of 60% E.C. or 8 lbs. of 50% W.P. to 100 gals. of water.	Do not use within 28 days of slaughter.
		Famphur (Famix)	Prepared feed mix 0.22** 10-day treatment for grubs.	Feed to beef cattle, heifers or dry cows only. Feed at rate of 1/4 lb. per 100 lbs. body weight for 10 days for grubs. Feed 1/8 lb. per 100 lbs body weight for 39 days for grubs and lice. Do not use after November 1. Do not use within 21 days of calving or 4 days of slaughter.
		Famphur (Warbex)	30-day treatment for grubs and <u>sucking</u> <u>lice</u> .	

**Typical concentration - Other concentrations available but are calculated to give animal proper dosage over specified treatment period.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Cattle lice (cont.)	BEEF CATTLE <u>ONLY</u>	<u>BACKRUBBERS</u>		
		Lindane	0.2% in fuel oil	Wait 30 days to slaughter.
		Malathion	2 - 5% in fuel oil	Follow all label precautions.
		Methoxychlor	5% in fuel oil	Follow all label precautions.
		Ronnel (Korlan)	1.0% in fuel oil	Follow all label precautions.
		Toxaphene	5% in fuel oil	Wait 28 days to slaughter.
		Ciodrin	1% solution	Follow all label precautions.
		Coumaphos (Co-Ral)	2% in fuel oil	Follow all label precautions.
		Tiguvon	1% in fuel oil	Follow all label precautions.
<u>Note:</u> (Backrubbers are <u>not</u> 100% effective against lice. Charge backrubbers early in the fall and re-charge every two to three weeks. Do <u>not</u> use old crankcase oil as a diluent for backrubbers.)				
	Dairy cattle	<u>SPRAYS</u>		
		Ciodrin	1 - 2 1/2 pts. of 2 lbs. per gal. E.C. to 30 gals. of water	Apply 1 - 2 gallons of spray. Do not repeat for 7 days, repeat in 14 days if necessary.
		Ciodrin	3% dry dust	Apply to animal by hand and rub into hair coat. Repeat in 3 - 4 weeks if necessary.
		Synergized pyrethrins	Water-based spray	Use as directed on the label.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Cattle lice
(cont.)Dairy cattle
(cont.)BACKRUBBERS[Some formulations of synergized
pyrethrins on backrubbers are
effective][Charge backrubbers in the fall and
re-charge every 2 to 3 weeks]

Ciodrin or Ciodrin-DDVP combinations

To be used as directed on the label.

Co-Ral
(Coumaphos)4 qts. 11.6% E.C. to
13 gals. of fuel or
diesel fuelCo-Ral has been registered for use
on backrubbers for either beef or
dairy cattle: Co-Ral cannot be used
as a spray or pour-on for lactating
dairy cattle.Ronnel
(Korlan)1% solution 1 gal.
24% E.C. to 27 gals.
fuel oil

May be used on lactating dairy cattle

Chiggers

Man

Benzyl Benzoate

Insect repellent or dusting sulfur applied to stockings
and tops of shoes or boots will afford some protection.For spraying
lawns, parks,
etc.

Chlordane

8 lbs. toxicant per
100 gals. of waterAllow to dry thoroughly before
allowing children and pets onto
treated area to play.

Lindane

1 lb. toxicant per
100 gals. of water

Use as directed on the label.

Note: For further information, check USDA, H & G Bull. No. 137.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Deer fly	Man	Commercial repellents afford temporary relief.		
	Livestock	Malathion	4% dust	Two - four tbsps. per animal; apply dry on backs. Observe five hour time interval to next milking if used on dairy cows.
		Synergized pyrethrins or allethrins	Prepared formulations	Use as directed on the label, may give temporary protection.
Dog fleas	Dogs	Malathion	1 oz. of 57% E.C. to 1 gal. of water or 4% dust	Treat the animal thoroughly with spray or dust. Repeat in 2 - 3 weeks if necessary.
		Carbaryl (Sevin)	5% dust	Dust animals and use to treat bed and kennel area.
		Ronnel (Korlan)	2/3 pt. of 12% E.C. to 1 gal. of water	Apply 1 gallon of spray per 1000 sq. ft. in kennel and runs.
		Coumaphos (Co-Ral)	0.5% dust	Do not use on nursing puppies or cats.
		Vapona - DDVP	Dog collars	Be sure to follow all label instructions.
Flies (face, horn, stable, house) mosquitoes & other nuisance insects (on animals)	Cattle (dairy)	Vapona (DDVP)	1% solution	Approved for "Grade A" dairies. May be used on lactating dairy animals. Either ready-to-use oil base spray or diluted water base spray may be used. Apply one fluid ounce per adult animal in the morning and one fluid ounce in the evening or apply two fluid ounces per adult animal in the morning. Water base spray may be baited using two cups of sugar per gallon (cont.)

Flies etc. (cont.)	Cattle (dairy) (cont.)	Vapona (DDVP)	1% solution	of one per cent spray solution to make a sweetened <u>face fly</u> bait. <u>Do not</u> exceed two fluid ounces per day. Reduce dosage proportionately for smaller animals. Mix and use as labeled.
		Ciodrin - Vapona insecticide combinations	Prepared formulations	Approved for "Grade A" dairies. May be used on lactating dairy animals. Ready-to-use oil solutions as labeled.
		Synergized pyrethrins sprays	Oil solution or water- based spray	As directed on the label.
		Ciodrin	1% spray, 1 qt. of 2 lbs. /gal. E.C. to 6 gallons of water	Water based spray - <u>pastured animals</u> - spray thoroughly to cover all parts of the animal using 1 - 2 pints of spray for larger animals - proportionately less for smaller animals. Do not spray more than once every 7 days.
			0.5% solution, 1 pt. of 2 lbs./gal. E.C. to 6 gals. of water	Water based spray - corralled or penned animals - spray thoroughly to cover all parts of the animal, using 1 - 2 quarts of spray for larger animals - proportionately less for smaller animals. Do not spray more than once every 7 days.
			2.0% ready-to-use spray or 2 qts. of 2 lbs./gal. E.C. to 6 gals. of water	Either ready-to-use oil base or diluted water base spray may be used. Apply 2 ounces of spray daily until fly populations are brought to low levels, then twice weekly. In warm, damp weather if fly populations build up, increase application frequency until flies are again brought under control.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Flies etc. (cont.)	Cattle (dairy) (cont.)	Ciodrin (cont.)	3% dry dust	Apply 1 to 2 tablespoonsful over back, withers and neck. Do not re-apply for 14 days.
		Malathion	4 - 5% dry dust	Two to four tablespoonsful per animal. Apply dry on back and withers. Observe 5 hour time interval to next milking.
		Methoxychlor	50% W.P. or dry dust. 2 tbsps. per adult animal	Apply over the back, withers, neck and poll. Re-apply in 21 days.
		<u>BARN FOGGING</u> Vapona, (DDVP)	1% solution, use 1 pt. of 1% or 2 pts. of 0.5% prepared fogging solution per 8000 cubic feet of barn space	Cattle may remain in the barn during fogging provided they have not had a direct Vapona insecticide application within 8 hours. <u>Do not</u> contaminate milk or milking utensils.
		Synergized pyrethrins	mist or fogging solution	May be applied with hand sprayers, microsols, foggers, automatic sprayers as often as needed.
		Dibrom	1% fogging solution at 1 oz./3000 cu. ft.	Use as space spray. Do not direct spray over the animals.
	Beef Cattle	Synergized pyrethrins for dairy cattle as above	Prepared formulations	May be applied with hand sprayers, microsols, foggers, automatic sprayers as often as needed.
		or Delnav	1 qt. of 30% E.C. or 2 qts. of 15% E.C. to 50 gals. of water	Spray on backs every 3 weeks as needed.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Flies etc. (cont.)	Beef Cattle (cont.)	Coumaphos (Co-Ral)	2 lbs. of 25% W.P. to 25 gals. of water	Use as directed on the label.
		Malathion	1 - 1 1/2 gals. of 57% E.C. to 100 gals. of water	Use as directed on the label.
		Malathion (ULV)	8 ozs. ULV conc./A.	Apply aerial applications over cattle and loafing areas. Do not confine cattle. Apply when infest- ations become heavy, (50 flies/side and/or 5 face flies/face), repeat as needed.
		Methoxychlor	0.5% spray or 5% in fuel oil with backrubber	Use as directed on the label.
		Ronnel (Korlan)	2 gals. of 25% E.C. or 16 lbs. of 25% W.P. to 100 gals. of water or 0.5% to 1.0% in fuel oil with backrubbers.	Do not <u>spray</u> within 7 days of slaughter. No waiting period on backrubbers.
		Toxaphene	0.5% spray or 5% in fuel oil with backrubber	Do not use within 28 days of slaughter.
		Ciodrin	1% solution	No waiting period to slaughter. See cattle section (dairy).
		Neguvon	1.0% water spray	A second treatment may be made. Do not spray within 14 days of slaughter. Do not treat dairy animals.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Flies etc. (cont.)	Beef Cattle (in feed lots)	Vapona (DDVP)	0.5% spray, 1 pt. of 4 lbs./gal. E.C. to 12 1/2 gals. of water	Apply 0.2 lbs. of actual chemical per acre as an overall treatment. Mist spray should be directed over entire area. Give particular atten- tion to areas where flies tend to congregate. Animals may be present during treatment. Avoid direct application to feed and water.
Horn fly	Dairy and Beef Cattle	Ciodrin	1% oil solution (backrubber)	Also aids in control of lice, face fly, stable fly, house fly and mos- quitoes. (<u>No</u> waiting period to slaughter.) May be used on lactating animals.
		Ciodrin	3% dust bag	
		Co-Ral (Coumaphos)	4 qts 11.6% E.C. to 13 gals. fuel or diesel oil or ready- made backrubber mixture	Charge backrubbers every 2 to 3 weeks. Co-Ral has been registered for use on backrubbers for either dairy or beef cattle; Co-Ral <u>cannot</u> be used as sprays on lactating dairy cows.
		Co-Ral (Coumaphos)	1% dust bag	No waiting period for slaughter.
Horse Bots	Horses	Anthon	5 gms. per 250 lbs. body weight	Mixed with feed, consumed at one feeding. Do not treat colts under four months or mares in last month of pregnancy. Do not give other drugs or treatments for two weeks after treatment.
		Equigard (dichlorovos pellet form)	3.2 gms./200 lbs. body weight	For sale by the order or by the pre- scription of a licensed veterinarian.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Horse fly

Livestock

Synergized pyrethrins or allethrins sprays for temporary protection.

House fly

Animal-bldg.,
horse barns,
dairy barns,
shelter sheds,
milk sheds and
hog sheltersVapona
(DDVP)0.5% spray - 1 pt. of
4 lbs. per gal. E.C.
to 12 1/2 gals. of
waterWater based spray. Use as spot or
strip spray in areas where flies
tend to congregate such as rafters,
box stalls, partitions, alleyways,
gutters, door and window frames,
floor, feed storage areas, at the
rate of 1 quart (0.5% solution) per
1,000 sq. ft. The addition of 2 cup
of sugar per gallon will increase
effectiveness.Ronnal
(Korlan)1% spray - 1 gal.
24% E.C. in 25 gals.
of waterRemove animals from buildings when
spraying residual sprays. Observe
all label precautions.Treatment of
bldgs. other
than milk
houses & food
processing
roomsSPRAYSRonnal
(Korlan)1 gal. 24% E.C. in
25 gals. waterRemove animals from buildings when
spraying residual sprays. Observe
all label precautions.

Malathion

2 qts. of 57% E.C.
or 10 lbs. of 25% W.P.
in 25 gals. waterRemove animals from buildings when
spraying residual sprays. Observe
all label precautions.

Cygon

1%, 1 gal. of 2 lbs.
E.C. to 25 gals. of
water

Observe all label precautions.

Rabon

4 lbs. 50% W.P. or 1
gal. 2 lbs. E.C. to
25 gals. of waterApply to ceilings and walls of build-
ings and sheds and to wooden fences.
Wet to run-off.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
House fly (cont.)	Treatment of bldgs. other than milk houses & food processing rooms (cont.)	<u>SPRAYS (cont.)</u>		
		Rabon-Vapona Combination (Ravap)	1 gal./25 gals. of water	Apply to ceilings and walls. Wet to run-off. Do not contaminate feed, feed troughs etc.
		Baytex	2 - 4 pts. of 4 lbs. per gal. E.C. to 100 gals. of water	Not to be used in interiors of dairy barns. Spray exteriors of buildings and fences. May be sprayed inside open sheds to be occupied by beef cattle. Do not contaminate feed and water.
		Dipterex (Neguvon)	1% solution or as directed on the label	Observe all label precautions.

BAITS AND TREATED STRIPS

Materials above as well as DDVP may be used in baits.

Vapona (DDVP)	20% slow release, 1 strip per 1,000 cubic feet	Follow instructions on the label. Excellent for milk rooms, milking parlors, etc. Do not hang over milk tank.
Dimetilan (Snip) fly bands	One band per 100 square feet	For use in farm buildings. Do not hang over water troughs or feed bunks.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
House fly (cont.)	Milk houses or food processing rooms	Pyrethrins (synergized)	Pressurized sprays	As space sprays, use as directed according to instructions on the label.
		Vapona (DDVP)	20% resin strip	1 strip per 1,000 cubic feet. Hang where will not contaminate utensils.
	Poultry houses	Vapona (DDVP)	0.5% spray 1 pt. of 4 lbs. E.C. to 12 1/2 gals. of water <u>or</u> 20% Vapona strips	Water based spray - apply as a coarse wet spray (1 qt. 0.5% per 1,000 sq. ft.) to window sills, alleyways and outside of penned enclosure. Treat twice weekly until flies are brought under control, once weekly thereafter. Improved control may be achieved by baiting the spray with 2 cups of sugar per gallon of solution. <u>Do not</u> spray chickens directly. Use of a 0.5% Vapona Dry Fly Bait is a helpful control supplement.
		Pyrethrins (synergized)		Use as directed on the label.
Lice, head, body	Man	Ronnel (Korlan)	1% spray - 1 gal. 24% E.C./25 gals. of water	Remove birds while spraying.
		Malathion	1% dust	Dust on affected areas and fluff into the hair. 1 oz. of 1% dust is suffi- cient to thoroughly treat a person. Treat bedding and blankets. Repeat at two week intervals until infesta- tion is controlled.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Lice (turkeys on range)	Turkey	Malathion	57% E.C. 2 qts. per 24 gals. of water	Spray directly on birds. Twenty-five gallons of spray should treat about 4,000 birds.
		Coumaphos (Co-Ral)	0.5% dust	Apply to birds according to label directions. Also recommended for fowl mites, poultry lice and roost mite.
Lice, northern fowl mite (direct application to bird)	Poultry	Malathion	2 1/2 ozs. of 25% W.P. to 1 gal. of water	Apply 1 gallon of diluted mixture per 100 to 150 birds. Dust application by means of a shaker can or with a rotary hand duster. Repeat application in 4 - 8 weeks or when necessary. Thorough coverage is necessary, especially under wings and around vent.
			<u>or</u> 2 tbsps. 57% E.C. to 1 gal. of water <u>or</u> 4% dust, applied liberally to birds	
Mites (red mite, poultry lice, northern fowl mite)	Poultry	Malathion	5 ozs. of 25% W.P. to 1 gal. of water	Follow all label restrictions.
			<u>or</u> 4 tbsps. of 57% E.C. to 1 gal. of water	Follow all label restrictions.
			<u>or</u> 4% dust at 1 lb./50 sq. ft. of litter surface	Follow all label restrictions.
		Carbaryl (Sevin)	5% dust, 1 lb./100 birds	Do not apply within 7 days of slaughter.
			<u>or</u> 1 lb./100 sq. ft.	Do not repeat within 4 weeks.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Mites (red
mite, poultry
lice, northern
fowl mite)
(cont.)

Poultry
(cont.)

Coumaphos
(Co-Ral)

0.5% dust, 1 lb. per
20 sq. ft. of litter
surface

Provide ventilation while dusting.
Do not apply more than once every
7 days.

Malathion

4 tbsps. of 57% E.C.
per gal. of water
(roost paint)

Brush on as a roost paint at the
rate of 1 pt. spray to 150 feet of
roost. When using insecticidal
sprays on or around poultry, always
avoid contamination of feed, feed-
ing troughs, and water fountains.

Mosquitoes
(adult)

Man

Commercial repellents

As directed on the label (offers
temporary protection).

Animal

Pyrethrins or
allethrins

As directed on the label (offers
temporary protection).

Lawns, shrubs
& other adult
resting areas

SPRAYS

Ronnel
(Korlan)

1% spray

Apply residual sprays to exteriors
of buildings, foundations, tree
trunks and undersides of leaves.
Apply with power or knapsack sprayer
in a coarse spray.

Carbaryl
(Sevin)

1 lb./5,000 sq.
ft. of lawn

Follow all directions and restriction
on all materials applied.

Malathion

2 - 5% spray

Follow all directions and restriction
on all materials applied.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Mosquitoes
(adult)
(cont.)Lawns, shrubs
& other adult
resting areas
(cont.)MISTS

Malathion

2 - 5% misting
solution

Follow all label precautions.

Vapona
(DDVP)0.5% misting
solutionApply as mist at a rate of 0.2 lbs.
per acre.ULV malathion
aerial appli-
cation

6 - 8 ozs./A.

Apply to suitable non-resident areas
Take special precautions to protect
cars because of spotting problems.Dibrom
(Oil Solution)

0.05 - 0.1 lb./A.

Apply aerial application over desired
areas. Follow directions of manu-
facturer for dilution.Dibrom 14 ULV
conc.

1 fluid oz./A.

Apply from airplane rigged for ULV
Dibrom application. Follow manu-
facturer's label recommendations for
application.

Dibrom

0.1 lb./A.

Apply with thermal fogging equipment
in desired areas. Check manufac-
turer's label for dilution direction
and restrictions.Mosquitoes
(larvae)Breeding areas
and ponds

Abate

granules or emul-
sion as directed
on label

No known danger to wildlife.

Malathion

8 ozs./A.

Follow all label restrictions.

Oil
(diesel fuel)

2 gal./A.

For treating breeding areas for tem-
porary control and where fish and
wildlife are present.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Scab or mange

Beef cattle
and sheep

Lindane

Dips or sprays

Notify the veterinarian or State
Livestock Sanitary Board to meet
State and Federal quarantine reg-
ulations.

Lime-sulfur

Dips

Swine

Lindane

2 lbs. of 25% W.P.
per 100 gals. of
water

Use as spray or dip. Treat sows at
least 40 days before farrowing. Do
not treat suckling pigs. Do not
treat within 30 days of slaughter
when using the spray or within 60
days of slaughter when using the dip

Toxaphene

1 gal. 4 lbs. E.C.
or 8 lbs. 50% W.P.
to 100 gals. water

Do not spray within 28 days of
slaughter.

Malathion

6 1/2 pts. of 5 lb.
E.C. or 16 lbs. of
25% W.P. to 100
gals. of water

Do not treat animals less than 1
month old. No time limitations.

Sheep lice &
keds (ticks)

Sheep

Delnav
(Dioxathion)

0.15% spray or dip

May be used anytime prior to
slaughter.

1
Ciodrin

3% dust 1 - 1 1/2
oz./animal

Apply by hand over back and sides.

Lindane

0.025% dip or 0.05%
spray 1 1/2 lbs. of
25% W.P. in 100 gals.
of water

Do not use within 30 days of slaugh-
ter for spray - 60 days for dip.

1 Based on effective performance in South Dakota as Ciodrin is federally registered for use on sheep, but not specifically for sheep ked.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Sheep lice & keds (ticks) (cont.)	Sheep (cont.)	Malathion	0.5% spray 1 gal. of 57% E.C. to 100 gals. of water	Do not use on lambs less than one month old.
		Coumaphos (Co-Ral)	0.25% spray 8 lbs. of 25% W.P. to 100 gals. of water	Do not use within 15 days of slaughter.
		Diazinon	0.05% spray 1/2 lb. of 50% W.P. in 100 gals. of water or 2% dust	Do not use within 14 days of slaughter.
		Ronnel (Korlan)	0.25% spray - 1 gal. 24% E.C. in 100 gals. of water	Do not use within 28 days of slaugh- ter. Do not apply oftener than every two weeks.
		Toxaphene	0.5% spray 10 lbs. of 40% W.P. in 100 gals. of water	Do not use within 28 days of slaughter.
		Ciodrin (spray)	2 1/2 pts. of 1.1 lbs./gal. E.C. to 16 gals. of water	Apply second spray 14 days later.
Sheep nose bot	Sheep	3% Saponated Cresol (Lysol) in water	One fluid ounce per nostril	Follow all label precautions.

INSECT

HOST

INSECTICIDE

DOSAGE*

REMARKS, PRECAUTIONS

Screw worms,
blow fly and
maggotsCattle (other
than dairy)Coumaphos
(Co-Ral)5% (spot treat dust)
or 2 lbs. of 25% W.P.
in 25 gals. of waterApply dust to wound areas. Spot
spray wound areas.Ronnel
(Korlan)

5% smear

Apply smear to wounds; no waiting
before slaughter of meat animals.Ronnel
(Korlan)2.5% pressurized
spray

Spray wound areas.

Spiders

Premises

Chlordane

2% water
emulsion sprayBreak webs and nests with a broom.
Spray basement, crawl spaces,
cellarways or other outbuildings
frequented by spiders.

Malathion

10% water
emulsion spraySpinose ear
tickHorses, cattle
and sheepCoumaphos
(Co-Ral)5% dust or 0.25%
spray

Dust or spray lightly in the ear.

Lindane

0.75% in Xylene-
pine oilApply approximately one-half ounce
per ear with snap-bottom oil can.

Stable fly

See other sections on fly control for recommended sprays for animal and premise sprays.
Sanitation and removal of breeding areas is essential see Fact Sheet No. 505.

Swine lice

Swine

Ciodrin

1 qt. 25.5% E.C./
100 gals. of water

No restrictions on slaughter.

Coumaphos
(Co-Ral)8 lbs. 25% W.P./
100 gals. of water

No time limitations.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Swine lice (cont.)	Swine (cont.)	Ronnel (Korlan)	5% granules, 1/2 lb./100 sq. ft. as a bedding treatment	May be used in pens occupied by baby pigs.
		Ronnel (Korlan)	0.25% spray 1 gal. 24% E.C. to 100 gals. of water	No withdrawal before slaughter.
		Toxaphene	8 lbs. 50% W.P./100 gals. water <u>or</u> 2 qts. 60% E.C./100 gals. water	Do not treat within 28 days of slaughter.
		Malathion	16 lbs. 25% W.P./ 100 gals. water <u>or</u> 1 gal. of 57% E.C./ 100 gals. water	No waiting period to slaughter.
		Lindane	1 - 1 1/2 lbs. of 25% W.P. <u>or</u> 1 qt. of 20% E.C./100 gals. water	Do not treat within 30 days before slaughter (spray) or 60 days before slaughter as a dip.
		Delnav (Dioxathion)	2 qts. of 21% E.C./ 100 gals. water	No waiting period between last application and last slaughter.
Ticks	Man	Benzyl Benzoate	Rub onto lower legs, trouser cuffs, and tops of socks before going on an outing or picnic in tick-infested areas.	
		Commercial repellents are available as liquids, cremes, sticks or aerosols. Names such as 6-12, SCAT or OFF.		Apply to lower legs and trouser cuffs and socks before going on an outing or camping. Do not allow materials to contact plastic personal items such as glasses frames, watch crystals, or compacts etc since these repellents are solvents for many plastics.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Ticks (premise treatments)	Man and animal	Malathion	2 - 3%	Spray backyard and outdoor areas of known infestation. Spray long grass, low shrubs and vegetation. Keep children and pets away while spraying. Do not allow them in the treated areas until spray has dried. Keep grass and weeds mowed short wherever possible to eliminate tick resting areas.
		Ronnel (Korlan)	2%	
		Chlordane	3%	
Wool maggot or fleece worm	Sheep	Ronnel (Korlan)	5% smear; 2.5% pressurized spray	Shear infested area and apply smear.
		Ronnel (Korlan)	0.5% jet spray, 2 gals. 24% E.C. to 100 gals. water	Do not use within 28 days of slaughter.
		Coumaphos (Co-Ral)	0.25% W.P. spray 8 lbs./100 gals. water, dip 4 lbs./100 gals. of water	Do not use within 15 days of slaughter.

Many materials recommended for beef animals cannot be used on dairy animals. In recommending any insecticides for dairy animals, make sure they are approved for this purpose. Observe all waiting periods for insecticides when used on meat animals. Follow label directions at all times.

Note: See Fact Sheet No. 433, Control of Dairy Livestock Pests in South Dakota and Fact Sheet No. 505, Insect Control on Beef Cattle for further control of any of the above insect problems.

Section V
Stored Grain Insects



INSECT	CROP	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Bin Sanitation	All bins and cribs	Malathion	1 % spray (Premium Grade	Thoroughly sweep and clean out and burn all old grain, chaff and dust.
		Methoxychlor	2 - 2 1/2% spray	Apply as a bin wall spray, do not apply directly on grain. Thoroughly sweep and clean out and burn all old grain, chaff and dust.
		Activated pyrethrum and other "bin sprays"	Use dosage suggested on label. Post signs on treated bins.	Apply spray to walls and floor to the point of run-off. Use as directed on the label. Thoroughly sweep, clean out and burn all old grain, chaff and dust.
Fumigants	Small grain	80% carbon tetrachloride -20% carbon bisulfide fumigant mixture*	Apply 4 - 5 gals./1000 bu. in wooden bins; apply 2 - 3 gals./1000 bu. in steel bins	Before fumigating apply residual spray to outside of bin. Level grain surface. Follow manufacturer's directions and precautions for use. Apply fumigants from outside of bin if possible. Use a gas mask with canister for organic vapors when exposed to fumes.
		Carbon tetrachloride-ethylene dichloride, ethylene dibromide*	Apply 4 gals./1000 bu. in wooden bins; apply 2 gals./1000 bu. in steel bins.	Fumigated grain may be fed to livestock after 3 - 4 days if it is stirred to hasten dispersion of fumigant.
		70% ethylene dichloride + 30% carbon tetrachloride	Apply 3 - 7 gals./1000 bu. in steel bins or 6 - 10 gals./1000 bu. in wooden bins	Apply to grain from outside bins from hand or motor pump - wear gas mask when exposed to fumes.

INSECT	CROP	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Fumigants (cont.)	Small grain (cont.)	Other fumigant mixtures containing carbon tetrachloride, carbon bisulfide, ethylene dibromide, ethylene dichloride, benzene, chloropicrin or sulfur dioxide. (Follow directions on the label for dosage. Follow all manufacturers precautions for directions and precautions for use).		
		Methyl bromide	from canisters or cylinders at 1 1/2 - 3 lbs./1000 cu. ft.	Preferably by trained personnel. Follow all precautions for handling fumigants <u>especially Methyl bromide</u> .
		Cyanogas G-fumigant granules	10 - 20 lbs./1000 bu. on grain as it is turned	<u>Extremely</u> dangerous to handle - should be handled only by trained professional personnel. <u>Extreme</u> protection and decontamination precautions must be taken when using Cyanogas. Do not use HCN on white corn because of staining problem.
		Phosphene (Phostoxin)	180 3 gm. tablets/1000 bu. (6 tablets /ton)	Insert tablets in grain mass with probe or drop tablets in grain stream as it is turned. Three to five day exposure. Follow all manufacturers precautions for handling tablets and aerating grain.
<p>*Warning: When applying fumigants always wear a suitable gas mask with a fresh canister. Do not use an insecticide respirator or a war surplus gas mask. Do not depend on your sense of smell to warn you because fumigants have an anesthetic effect on the sense of smell. Always work in pairs when handling fumigants; never work alone.</p>				
Protectants	Wheat	Malathion	1 pt. premium grade 57% emulsion in 2 - 5 gals. of water for each 1000 bushels; or 1% premium grade malathion on flour dust at a rate of 60 lbs. per 1000 bushels	The protectant sprays and dusts are preventive measures and should be applied according to directions on the container to grain before it is binned. Bin should be cleaned and sprayed.

INSECT	CROP	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Protectants	Corn, other feed grains	Grain protectant	Dust or spray (activated pyrethrum)	Follow all label directions.
Indian meal moth	Shelled corn	Malathion	Top dressing with 1/2 pt. of premium grade 57% emulsion in 1 - 2 gals. of water/1000 sq. ft. of grain surface area; or 30 lbs. of 1% premium grade malathion on wheat flour dust/1000 sq. ft. of grain surface	Apply to clean or uninfested grain evenly over the surface. Apply immediately after storage. Repeat if necessary. Follow all label precautions.
		Mineral oil	Apply mineral oil protective spray to surface of grain shortly after putting the grain into the bin, using 2 quarts/100 sq. ft.	For active infestation use fumigant on surface to stop infestations and follow with fine mist spray in head space above grain using synergized pyrethrum. Repeat in 15 - 20 days and thereafter as needed.
	Stored seed	Malathion	1/2 pt. of premium grade 57% emulsion to 1 - 2 gals. of water/500 bushels of seed; or 30 lbs. of 1% premium grade malathion on wheat flour dust/500 bushels of seed	Follow all label precautions.

Section VI
Household Insects



INSECT	INSECTICIDE	DOSAGE	REMARKS, REFERENCES
Ant	Chlordane	2% spray, 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Spot treatment over runways in homes. Apply to the foundation around homes. Treat ant nests in the yard. USDA Home and Garden bulletin no. 28.
	Malathion	3% spray, 1 quart of 57% E.C. solution per 6 gallons of water	Follow all label directions.
Bed bug	Malathion	3 tbsps. of 57% E.C. in 1 gallon of deodorized kerosene	Apply to bed springs, cracks in the walls, floors, baseboards, frames etc.
Box elder bug	Carbaryl (Sevin)	2 tbsps. of 50% W.P. to one gallon of water	Apply outside of the home where bugs congregate. See Section IX - Pests of Shade Trees and Ornamentals for more extensive details.
	Chlordane	0.5% spray, 1 gallon of 8 lbs. E.C. to 20 gallons of water	Follow all label directions.
Carpenter ant (not termites)	Malathion	3% spray, 1 quart of 57% E.C. to 6 gallons of water	Remove badly infested and tunneled wood. Paint chlordane solution on wood and ant runways.
	Chlordane	2% spray - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water.	Follow all label directions.
Carpet beetle	Chlordane	2% spray - 1/2 pint of 8 lbs. E.C. to 3 gallons of water	Use household grade solution; spray carpets and pads, stored woolens, upholstered furniture, etc.
	Malathion	3% spray - 1 quart of 57% E.C. to 6 gallons of water	Follow all label directions.

INSECT	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Carpet beetle (cont.)	Methoxychlor	5% spray	Follow all label directions.
Clothes moth	Chlordane	2% spray - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Use household grade solution. Apply same as for carpet beetle. Dry cleaning before using.
	Methoxychlor	5% spray	Follow all label directions.
Clover mite	Dimite	Use as directed on the label.	Apply to foundation of house, also to lawn and shrubs for about 20 - 30 feet, all around house. A 12 - 14 inch grass free area next to the foundation all around the house may alleviate mite problems. USDA leaflet no. 134.
	Malathion	1% spray - 1 1/3 pints of 57% E.C. to 6 gallons of water	
	Chlorobenzilate	1% spray - 4 lbs. of 25% W.P. to 12 1/2 gallons of water	Follow all label precautions.
	Kelthane	2 tsp. of 18.5% W.P. to 1 gallon of water	Follow all label precautions.
	Genite	As directed on the label.	Follow all label precautions.
	Tedion	As directed on the label.	Follow all label precautions.
Cockroach	Chlordane	2% solution - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Apply as spot treatment preferably with paint brush to under sides of drawers, sinks, cabinets etc. USDA leaflet no. 430.
	Ronnel	1.5% oil solution or water emulsion - 1 cup E.C. per gallon of water	

INSECT	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Cricket	Chlordane	2% solution - 2 pints of 8 lbs. E.C. to 12 1/2 gals. of water	Apply as spot treatments along baseboards, in corners of closets, etc. Also, treat foundations, walls, basement windows. Use fly swatters for few crickets.
Fleas	See Livestock Section		
House fly	DDVP (Vapona) slow release plastic strips Activated pyrethrum or thiocyanate space sprays and aerosols		Follow all label precautions and directions. Sanitary garbage disposal. Residual sprays and baits; see Section IV for residual fly treatments.
Millipede	Carbaryl (Sevin)	8 tbsps. 50% Carbaryl in 2 gallons of water	Follow all label precautions and directions.
Mosquito	DDVP (Vapona) slow release plastic strips Activated pyrethrum space sprays and aerosols Malathion, residual sprays, use as directed on the label		Follow all label precautions and directions. Treatment of breeding areas, residual sprays; see Section IV for lawn and shrub treatments for mosquitoes.
Powder post beetle	Chlordane	2% spray - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Remove and replace badly infested wood. Spray or paint lightly infested and uninfested wood in the vicinity. Re-treat to saturate wood.
Silverfish	Chlordane	2% spray - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Apply with paint brush or hand sprayer to infested areas, especially behind radiators and in corners.

INSECT	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Spiders	Chlordane	2% solution - 2 pints of 8 lbs. E.C. to 12 1/2 gallons of water	Apply spray to spiders. Sweep down webs and destroy spiders with broom when they are not numerous.
Stored food pests, flour beetles, "bran bugs" weevils, larder beetles meal moths, etc.	Malathion	1 - 2% solution	Remove and destroy heavily infested foods. Heat treatment in flat pans at 140 to 150 degrees for about one-half hour. Store cereal foods and flour in tight jars or cans. Apply chlordane with paint brush to whelves, drawers. <u>Do not contaminate food.</u>
	Chlordane	3% spray - 1/2 pint of 8 lbs. E.C. to 2 gallons of water	
Termites	Pentachlorophenol	5% solution in light fuel oil as a wood treatment	Replace all infested support timbers with lumber treated with Penta. Soil treatment around all foundations as a barrier to kill termites as they pass through the soil. Cracks and crevices in foundations used as runways should be sealed.
	Chlordane	1% water emulsion - 1 pint of 8 lbs. E.C. to 12 1/2 gallons of water	
	Heptachlor	0.5% water emulsion - 1 quart of 3 lbs. E.C. to 25 gallons of water	
	Dieldrin	0.5% water emulsion - 1/3 pint of 1 1/2 lbs. E.C. to 1 1/2 gallons of water	Follow all label precautions and restrictions.

Special Note: When using insecticides around the home be sure to exercise extreme care to avoid accidental poisoning. Children and pets should not be allowed access to storage cabinets or freshly treated areas. Follow the label directions and observe all safety precautions.

Section VII
Small Fruit Insects



INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Aphid	Currants and gooseberries	Malathion	2 lbs./A. W. P.	Do not apply to currants within one day or to gooseberries within 3 days of harvest. Apply as leaf buds are opening or later if infestation occurs.
Crown borer	Strawberries	Chlordane	1 lb./A.	Do not apply after fruit begins to form.
Flea beetles	Strawberries	Rotenone	1 lb./A.	May be used when bearing.
		Methoxychlor	1 1/3 lbs./A. (dust or W.P.)	Do not harvest for 3 days.
Imported currant worm	Currants and gooseberries	Malathion	2 lbs./A. W.P.	Do not apply to currants within 1 day or to gooseberries within 3 days of harvest.
Leafhoppers	Grapes and strawberries	Carbaryl (Sevin)	1 lb./A.	No limitations on grapes, 1 day on strawberries.
		Malathion	1 lb./A.	Do not apply within 3 days of harvest.
Leafroller	Strawberries	Malathion	1 lb./A.	Do not apply within 3 days of harvest.
		Carbaryl (Sevin)	1 lb./A.	Do not apply within 1 day of harvest.
		Rotenone	1 lb./A.	May be used during bearing.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Rose chafer	Grape and many other plants	Carbaryl (Sevin)	1 lb./A.	No time limitations. Check the label for interval on commodity involved.
Spider mites	General	Kelthane	12 ozs./A.	Read labels for intervals between treatment and harvest for commodity involved.
		Tedion	1 lb./A.	Treat before fruit forms.
		Malathion	1 lb./A.	Read labels for intervals between treatment and harvest for commodity involved.
White grub	Strawberries	Chlordane	10 lbs./A.	Work into soil thoroughly at planting time.

For the small farm or home fruit garden the all-purpose fruit spray mixture of methoxychlor, malathion and captan are recommended. Treatment should begin when blossoms have dropped and repeated at 7 to 10 day intervals. Note: Please refer to Page 4, for dilution table when mixing sprays.

*In terms of actual toxicant per acre.

Section VIII
Pests of Fruits



INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Aphid	Plum and apple	Malathion	1 lb./100 gallons of water	Do not harvest within 3 days.
Cankerworms and other leaf-chewing caterpillars	General	Methoxychlor	1 lb./100 gallons of water	Spray early in the spring or when worms hatch.
		Carbaryl (Sevin)	1 lb./100 gallons of water	Follow all label precautions.
Codling moth and apple maggot	Apple and pear	Carbaryl (Sevin)	1 lb./100 gallons of water	Pears and apples, 1 day between treatment and harvest.
		Methoxychlor	2 lbs./100 gallons of water	Do not harvest for 7 days.
		Imidan	0.75 lb./100 gallons of water	Do not harvest for 7 days.
		<u>Note:</u> Follow complete spray schedule, starting with calyx or petal fall spray. Fruit spray schedules are available from Extension Service Bulletin Room, South Dakota State University. Practice orchard sanitation, gather dropped fruit to reduce maggot population.		
European Red mite	Apples and plums	Superior mineral oil, 70 sec. visc.	2 gals./100 gallons of water	Apply anytime from green tip stage until flowers show pink.
Leaf hopper	General	Carbaryl (Sevin)	1 lb./100 gallons of water	Check labels for waiting period before harvest, commodity and insecticide involved.
		Malathion	1 lb./100 gallons of water	Follow all label precautions.
<u>Note:</u> Please refer to Page 4, for dilution table when mixing sprays. All dosages are in terms of actual toxicant per 100 gallons of water.				

INSECT	CROP	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Leaf roller and leaf crumpler	General	Carbaryl (Sevin)	1 lb./100 gallons of water	Do not apply within 1 day of harvest.
Oyster shell scale	General	Dormant oil spray + liquid lime sulfur	1 1/4 lb. (1 qt. 57% E.C./100 gals. of water)	Apply as directed on the label, early in the spring before the buds open. Temperatures should be above 40 degrees.
		Carbaryl (Sevin)	1 lb./100 gallons of water	Follow all label precautions.
		Malathion	1 lb. 57% E.C./100 gallons of water	Follow all label precautions.
Peach tree borer	Plum and peach	Paradichlorobenzene (PDB)	2 lbs. in one gallon of dormant oil. Apply to infested areas.	Prevent injury, prune carefully during dormant season. Cut out all dead wood. Promptly repair wounds and cankers.
		Guthion	8 ozs./100 gallons of water	<u>Commercial applicators only.</u> Check label for precautions and direction of application.
		Thiodan (Endosulfan)	8 ozs./100 gallons of water	Do not harvest for 21 days. Spray all bark from ground level to scaffold limbs. Follow all label precautions.
Plum curculio	Apple and plum	Carbaryl (Sevin)	1 lb./100 gallons of water	Wait 1 day between application and harvest. Apply at petal fall following with 2 sprays at 10 day intervals.

Note: Please refer to Page 4, for dilution table when mixing sprays. All dosages are in terms of actual toxicant per 100 gallons of water.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Plum curculio (cont.)	Apple and plum (cont.)	Methoxychlor	1 1/2 lbs./100 gallons of water	Do not harvest for 7 days.
San Jose scale	Apple, pear peach and plum	Dormant spray, superior min- eral oil	2 gals./100 gallons of water	Observe all label precautions.
		Carbaryl (Sevin)	1 lb./100 gallons of water	Do not harvest for 1 day.
Slug and sawfly larvae	Plum and cherry	Carbaryl (Sevin)	1 lb./100 gallons of water	Observe label precautions. Wait 1 day between application and harvest.
Spider mites	General	Kelthane	6 ozs./100 gallons of water	See Spider Mites, Section VII.
		Tedion	0.4 lbs./100 gallons of water	Check labels for number of appli- cations allowable and waiting period.
		Malathion	1 lb./100 gallons of water	Read the label for restrictions. Observe intervals between treat- ment and harvest as indicated on the label.
		Chlorobenzilate	0.2 lbs./100 gallons of water	Apply to pink and pre-pink stage before fruit starts to form.
		Genite	1 1/2 pts. 50% E.C./100 gallons of water	Do not spray on poor drying days.
Web spinning sawfly	Plum	Methoxychlor	1 lb./100 gallons of water	Follow all label precautions.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
--------	------	-------------	---------	----------------------

Note: *Consult current complete orchard spray schedules. The control of most orchard pests and diseases requires a full season-long program. For the average farm or backyard orchard, recommend an all-purpose fruit spray containing methoxychlor and malathion plus a fungicide such as captan or ferbam. Advise treatments every 7 to 10 days during the season, except during blossom. Please refer to Page 4, for dilution table when mixing sprays. (All dosages are in terms of actual toxicant per 100 gallons of water.

Special Precaution: Bees are attracted in great numbers to blooming fruit trees, and the value of bees as pollinators is considerable. In order to not endanger bees take special care to avoid spraying fruit trees about to bloom or in full bloom.

Section IX
Pests of Shade Trees and Ornamentals



INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Aphids	General	Malathion	1 lb. (4 lbs. of 25 W.P. or 1 1/2 pts. of 57% E.C. per 100 gallons of water	Follow all label precautions.
Box elder bug	Trees, foundations etc.	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P. to 100 gallons of water	Do not apply to Boston or English Ivy.
		Chlordane	2 lbs. (1 quart of 8 lbs. E.C.) to 20 gallons of water	Apply to trees in summer when bugs are young and to bugs massed on trunks, walls etc.
Cankerworm	Trees	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P.) to 100 gallons of water	(See Extension Circular no 670). Follow all label precautions.
		Methoxychlor	2 lbs. (50% W.P. or 2 quarts, of 25% E.C.) per 100 gallons of water	Apply in the spring, when worms first hatch.
		<u>Bacillus thuringiensis</u>	1 quart 90T/acre by air-plane or 1 quart in 50 gallons of water by ground equipment	Follow all label precautions.
Caterpillar leaf feeding	General	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P.) per 100 gallons of water	(See Extension Circular no. 670). Follow all label precautions.
		Methoxychlor	1 lb. (2 lbs. 50% W.P.) per 100 gallons of water	Follow all label precautions.
Cutworms (climbing)	General	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P.) per 100 gallons of water	Follow all label precautions.
		Methoxychlor	1 lb. (2 lbs. 50% W.P.) per 100 gallons of water	Follow all label precautions.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Leaf feeding beetles and larvae	General	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P.) per 100 gallons of water	Follow all label precautions.
		Methoxychlor	1 lb. (2 lbs. 50% W.P.) per 100 gallons of water	Follow all label precautions.
Leaf hopper	General	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P. <u>or</u> 2 lbs. of 50% W.P.) per 100 gallons of water	Follow all label precautions.
		Malathion	1 1/4 lbs. (1 quart of 57% E.C. <u>or</u> 5 lbs. of 25% W.P.) per 100 gallons of water	Follow all label precautions.
Leaf roller	General	Carbaryl (Sevin)	1 lb. (2 lbs. of 50% W.P. <u>or</u> 1 1/4 lbs. of 80% W.P.) per 100 gallons of water	Follow all label precautions.
Plant bug	General	Carbaryl (Sevin)	1 lb. (2 lbs. of 50% W.P. <u>or</u> 1 1/4 lbs. of 80% W.P.) per 100 gallons of water	Follow all label precautions.
Scale insects	General	Dormant oils or liquid lime-sulfur		Dormant sprays are to be applied before buds open in spring; follow directions and precautions on the label. Do not spray after trees begin to show green. Do not apply dormant oils to blue spruce. Apply after crawlers hatch in the spring.

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Scale insects (cont.)	General (cont.)	Carbaryl (Sevin)	1 lb. (1 1/4 lbs. of 80% W.P.) per 100 gallons of water	Follow all label precautions.
		Malathion	1 1/4 lbs. (1 quart of 57% E.C. or 5 lbs. of 25% W.P.) per 100 gallons of water	Follow all label precautions.
Spider mites "red spider"	General	Chlorobenzilate	6 ozs., (1 1/2 lbs. of 25% W.P. or 1 1/2 pts. of 25% E.C.) per 100 gallons of water	Follow all label precautions.
		Malathion	1 1/4 lbs. (1 quart of 57% E.C.) per 100 gallons of water	Follow all label precautions.
		Kelthane	6 ozs., (2 lbs. of 18.5% W.P.) per 100 gallons of water	Follow all label precautions.
		Tedion spray	4 ozs., (1 lb. of 25% W.P.) per 100 gallons of water	Do not apply to butterfly or cinderella roses.
		Dimite	4 ozs., (1 lb. of 25% W.P.) per 100 gallons of water	Follow all label precautions.
		Genite	0.2 lbs./100 gallons of water	Follow dilution and mixing instructions on the label. Do not apply on poor drying days.
Tree borers		Carbon disulphide fumigant		Prune off and burn dead limbs. Keep trees healthy, well pruned and repaired. Trunks of young trees should be wrapped and protected from sunscald and mechanical injury.
<p><u>Note:</u> See following page for further precautions and instructions.</p>				

INSECT	HOST	INSECTICIDE	DOSAGE*	REMARKS, PRECAUTIONS
Tree borers (cont.)		Carbon disulphide fumigant (cont.)		Inject into holes with oil can. Plug holes with clay or putty. <u>Extremely flammable.</u> Keep away from fire or sparks.

*A satisfactory "all purpose" mixture for shade trees and ornamentals may be prepared by combining 2 pounds of 50% wettable powder of methoxychlor and 4 pounds of 25% malathion wettable powder. It is safest to use wettable powders; emulsions may burn the foliage of some trees and shrubs.

Section X ➡
Lawn Pests

INSECT	CROP	INSECTICIDE	DOSAGE	REMARKS, PRECAUTIONS
Ants	Lawn	Chlordane	1 lb./A.	Add 1 lb. in 50 gallons of water and soak infested areas.
White grubs	Lawn	Chlordane	5 lbs./A.	Water thoroughly after making application. Allow sufficient drying time before allowing pets or children on the lawn.
Sod webworm	Lawn	Chlordane	2 1/2 lbs./A.	Water in after application, keep children and pets off until lawn is completely dry.
		Carbaryl (Sevin)	1 lb./5000 sq. ft.	Apply in 150 gallons of water. Keep children and pets off until lawn is completely dry.
Earthworm	Lawn	Chlordane	10 lbs./A.	Water thoroughly after making applications. Allow sufficient drying time before allowing pets or children on the lawn.



GLOSSARY

- ABATE** - An organic phosphorus insecticide, effective as a mosquito and midge larvicide. Excellent as larvicide since it has virtually no hazard to wildlife at working dosages.
MAMMALIAN TOXICITY: Low.
- ACARICIDE** - A chemical used to control mites; sometimes called a MITICIDE.
- ACTIVATOR** - A substance that accelerates the effect or increases the total effect of a pesticide - See SYNERGIST.
- ACTIVE INGREDIENTS** - An ingredient which will in itself destroy or kill insects, fungi, rodents, weeds or other pests.
- AEROSOL** - A colloidal suspension of solids or liquids in air. Insecticide aerosols are made by mixing the dissolved active ingredient in a liquid with a low boiling point. When a valve is released the propellant liquid and the active ingredient are released into the air.

Insecticidal aerosols are used primarily as space sprays against flying insects and household insects.
- ALDRIN** - A chlorinated hydrocarbon insecticide similar to dieldrin and heptachlor. Kills both by contact and stomach action. Used principally as soil insect control.
HUMAN TOXICITY: Moderately High.
- ALLETHRIN** - A synthesized insecticide with properties similar to those of the PYRETHRINS. Used in household aerosols, garden, and livestock sprays. Often called SYNTHESIZED PYRETHRUM.
HUMAN TOXICITY: Moderately low.
- ALUMINUM PHOSPHIDE** - See PHOSPHINE.
- ANTHON** - See TRICHLORFON.
- ANTIDOTE** - A practical immediate treatment, including first-aid, in cases of accidental poisoning.
- ARAMITE** - An acaricide, used mainly to control mites on shade trees, ornamentals, and a few row crops.
HUMAN TOXICITY: Low.
- ATROPINE** - The drug prescribed as first-aid for poisoning from the organic phosphate and carbamate insecticides.
WARNING: Atropine is antidotal not preventative for poisoning.
Also, ATROPINE SULFATE.
- ATTRACTANT** - A material which elicits a positive response. Attractants are sometimes mixed with baits to make them more attractive to pests, in order to hasten and increase their activity.
- AZINPHOS METHYL** - See GUTHION

AZOBENZENE - A material which is used as a fumigant principally in greenhouses.
HUMAN TOXICITY: Low.

BACILLUS THURINGIENSIS - A biological control agent utilizing the spores of a bacterium, Bacillus thuringiensis. Shows promise as a biological control when conditions are so that it can be directly applied.
HUMAN TOXICITY: None.

BAND APPLICATION - Application of a chemical in a continuous band over or beside the seeds in a row crop.

BANDANE - A relatively new chlorinated hydrocarbon, at present only registered for lawn use.
HUMAN TOXICITY: Moderate to high.

BASAL APPLICATION - Application of sprays or granules in the rows on the soil at the bases of growing plants. Used in row crop treatments.

BAYGON - A carbamate insecticide registered principally for control of mosquitoes, flies, ants, roaches, and sandflies. Restricted for use by qualified Pest Control Operators and Public Health officials.
HUMAN TOXICITY: High.

BAYTEX - An organic phosphorus insecticide used primarily in controlling flies, mosquitoes, and roaches.
Also, FENTHION.
HUMAN TOXICITY: Moderate.

BENZYL BENZOATE - Used mainly as an insect and mite repellent for human use, HUMAN TOXICITY: Low.

BHC - See BENZENE HEXACHLORIDE.

BIDRIN - An organic phosphorus insecticide with plant systemic action, effective against certain plant mites.
HUMAN TOXICITY: High

BIOLOGICAL CONTROL - The use of parasites, predators and disease organisms as vital factors in natural control of a pest. Biological control includes the use of insects to control weeds as well as using other living organisms for controlling pests.

BROADCAST APPLICATION - Application of a pesticide over an area rather than being applied in a band to a row crop.

BUX - A carbamate insecticide effective as a granular formulation against resistant corn rootworms.
HUMAN TOXICITY: High.

CALCIUM CYANIDE - A granular material that upon exposure to the natural moisture in air forms hydrocyanic acid gas. Used as a fumigant by grain handling firms and for rodent control in Public Health. Use is restricted to those persons who understand the use and hazards in handling cyanide.

CARBARYL - A carbamate insecticide. Used widely for fruit, vegetable and flower insects; also effective for grasshopper nymphs on pasture land.

HUMAN TOXICITY: Moderately low.

Also, SEVIN

CARBOFURAN - See FURADAN

CARBON DISULPHIDE - A highly volatile liquid used widely as a fumigant especially stored grain insects. Is extremely explosive when mixed in air.

HUMAN TOXICITY: Moderately high, avoid breathing the vapors.

CARBON TETRACHLORIDE - A highly volatile liquid used as a fumigant, or added to fumigant mixtures as a fire suppressant.

HUMAN TOXICITY: Moderate, avoid prolonged exposure to vapors.

CARRIER - An inert material added to a poison to facilitate dilution or application. Carriers may be solids or liquids.

CHLORDANE - A chlorinated hydrocarbon insecticide closely related to aldrin and heptachlor. Used widely in household insects and termite control. Has a relatively long-lasting residue.

HUMAN TOXICITY: Moderate.

CHOLINESTERASE - The chemical esterase present in all body tissue cells which hydrolyzes acetylcholine into choline and acetic acid.

CHOLINESTERASE INHIBITOR - Chemicals that inhibit the production of cholinesterase and cause death of an organism by failure of the central nervous system.

CIODRIN - An organic phosphorus insecticide widely used in dairy insect control.

HUMAN TOXICITY: Moderate.

COMPATIBILITY - The ability of chemicals to be mixed together without altering the effectiveness of either chemical.

CONCENTRATION - Expression of the amount of active ingredient in an insecticidal formulation. Concentration may be expressed in percent, ounces, or pounds of active ingredient.

CONTACT INSECTICIDE - A chemical that causes death of an insect with which it comes in contact; eating is not necessary.

CO-RAL - See COUMAPHOS

COUMAPHOS - An organic phosphorus insecticide used as an animal systemic. Applied as a spray for control of cattle grubs, lice and other parasites.

HUMAN TOXICITY: Moderate.

Also, (CO-RAL)

CREOSOTE - Wood preservative used as treatment of wood for to prevent attack of termites.

CYGON - See DIMETHOATE.

DASANIT - An organic phosphorus insecticide-nematicide. Available as a ten percent granular formulation for control of resistant corn rootworms.

HUMAN TOXICITY: High.

DD - A fumigant mixture containing dichloropropane and dichloropropene, principal use is, as a soil fumigant.

DDD - See TDE.

DDT - The first of the chlorinated hydrocarbon insecticides discovered.

DDT is a stable chemical with long persistence with a fairly high toxicity for insects with low hazard for mammals. DDT is cancelled for all uses and is no longer legally used in South Dakota.

DDVP - See DICHLORVOS

DEFOLIANT - A material which hastens shedding of leaves. Often used prior to harvest or picking of certain field crops.

DELNAV - See DIOXATHION.

DEMETON - An organic phosphate insecticide used to control aphids and mites in plants.

HUMAN TOXICITY: High.

DERMAL TOXICITY - The amount of a given toxic material necessary to kill a test population by allowing the material to remain in contact with intact skin of the test animal.

DESSICANT - A material that hastens drying of leaves and plants comparable to freezing.

DIAZINON - An organic phosphate insecticide used primarily as a residual spray for control of house flies, roaches, and certain fruit, vegetable, and field crop insects.
HUMAN TOXICITY: Moderate to high.

DIBROM - See NALED

DICHLORVOS - An organic phosphate insecticide used in baits, space sprays, aerosols. A contact poison, acts also as a fumigant. Controls household and public health pests, stored product insects.
HUMAN TOXICITY: High.
Also, (DDVP and VAPONA)

DIELDRIN - A chlorinated hydrocarbon related to ALDRIN, generally considered more stable than aldrin.
HUMAN TOXICITY: Moderate to high.

DILUENT - A material added to an active ingredient to facilitate application. See CARRIER.

DIMETHOATE - An organic phosphorus insecticide registered for housefly and roach control, and in dairy fly control.
HUMAN TOXICITY: Moderate.
Also, (CYGON)

DIMETILAN - A carbamate insecticide used for fly control by attaching impregnated bands to barn ceilings.
HUMAN TOXICITY: High.

DIOXATHION - An organic phosphate used as an external parasite control for livestock and as a miticide.
HUMAN TOXICITY: High
Also, (DELNAV)

DIPTEREX - See TRICHLORFON.

DISPERSING AGENT - A material that reduces cohesive attraction between like particles. Wetting agents or detergents are good examples.

DI-SYSTON - An organic phosphorus insecticide that possesses systemic action in plants; used for control of aphids and mites.
HUMAN TOXICITY: High.
Also, DISULFOTON

DORMANT OILS - Refined oils formulated with emulsifiers which are applied to plants in late winter or early spring as a control for overwintering stages of scales, aphids, and mites.

DRIFT - Is the movement of a portion of the airborne particles of a dust or spray away from the intended point of application. Sensitive crops at a distance may be injured by drift of herbicides.

DUSTS - Finely divided insecticide dusts mixed with talc, clay, calcium carbonate etc. Not to be confused with WETTABLE POWDERS.

DYFONATE - An organic phosphorus insecticide used mainly as a control for resistant corn rootworm and other soil insects.
HUMAN TOXICITY: High.

DYLOX - See TRICHLORFON.

ECONOMIC POISON - A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fumigant, pruning paint, fungicide, disinfectant, germicide, and any other product intended for use on other forms of undesirable plant, animal, or virus.

EMULSIFIABLE CONCENTRATE - A product containing active ingredient (s) in some oil solvent and an emulsifying agent. These materials are mixed or suspended in water to the proper dilution for spraying.

EMULSIFYING AGENT - A substance which aids in the product or maintenance of a dispersion of one liquid within another. Soap is a good example.

EMULSION - A mixture in which one liquid is suspended in small globules or droplets in another liquid. For example a mixture resulting from adding an emulsion concentrate insecticide to water.

ENDOSULFAN - A sulfur compound registered mainly for use on fruits and vegetables against insects, and mites. THIODAN.
HUMAN TOXICITY: Moderately high.

ENDRIN - A chlorinated hydrocarbon related to aldrin and chlordane, used for control of cotton insects and vegetable pests.
HUMAN TOXICITY: High.

ENTEX - See BAYTEX

EPN - Organic phosphate insecticide and miticide with long residual action.
HUMAN TOXICITY: High.

ETHYLENE DIBROMIDE - A chemical compound with a high vapor pressure used as a soil fumigant, and a stored grain fumigant.
HUMAN TOXICITY: High if vapors are inhaled.

FAMOPHOS - See FAMPHUR
Also, WARBEX

FAMPHUR - An organic phosphate insecticide formulated as a pour-on, spray and feed additive for control of lice and grubs.

FENTHION - An organic phosphorus insecticide. See BAYTEX.

FULL COVERAGE SPRAY - This signifies that the total volume of spray will cover the crop being treated to the point of run-off or drip.

FUMIGANT - A substance or mixture which will produce a fog or vapor which is intended to destroy insects, rodents, or bacteria.

FUNGICIDE - A substance intended to destroy or mitigate fungi.

FURADAN - A carbamate insecticide formulated for soil application for corn rootworm.
HUMAN TOXICITY: High.

GAMMA BHC - See LINDANE

GARDONA - An organic phosphate insecticide of low mammalian toxicity used for control of certain crop and fruit insects.
RABON* is residual wall spray for fly control.

GUTHION - An organic phosphate insecticide for control of fruit, vegetable and field crop insects.
HUMAN TOXICITY: High
Also, AZINPHOS METHYL

HEPTACHLOR - A chlorinated hydrocarbon related to aldrin and chlordane with a short residual action, used as soil insecticide.
HUMAN TOXICITY: Moderately high.

HERBICIDE - A substance or mixture intended to prevent, destroy or mitigate plants which are declared to be weeds.

HOST - Any plant or animal harboring a living parasite from which it derives its nourishment. Example: a cow is the host to cattle grub.

HYDROGEN CYANIDE (HCN) - A chemical which produces hydrocyanic acid gas, used as an insect and rodent fumigant.
HUMAN TOXICITY: Very high, avoid breathing vapors.

INSECTICIDE - A mixture or substance intended to prevent, destroy, repel or mitigate insects which may be present in any environment. Insecticides may fall into six general categories; Stomach, Contact, Residual Contact, Fumigant, Repellent, and Systemic.

INERT INGREDIENT - A substance which will not by itself add to effectiveness but serves to make a substance easier to apply.

IMIDAN - An organic phosphorus insecticide-acaricide of moderately high toxicity.
HUMAN TOXICITY: Moderately high.
Also, PROLATE

- KELTHANE - A chlorinated miticide. Effective against mites on ornamentals.
HUMAN TOXICITY: Moderate.
- KEPONE - A chlorinated ketone used in bait formulations for control of roaches and ants.
HUMAN TOXICITY: Moderately high.
- KORLAN - See RONNEL.
- LABEL - All written, printed, or graphic matter on or attached to an economic poison, or the immediate container thereof, and on the outside wrapper to the retail package of the economic poison.
- LD₅₀ - Indicated the amount of a toxic material to effect a 50% mortality of an organism being tested. The number may specify the insect pest or a mammalian test animal usually expressed in mg/kg.
MEDIAN LETHAL DOSE
- LETHANE - Esters of thiocyanic aliphatic acids used mainly in mist fly sprays.
(LETHANE) is trade-name designation.
HUMAN TOXICITY: Low.
- LIME-SULFUR - A fungicide and insecticide used as a livestock dip also to control scales and diseases on fruit and ornamental trees.
- LINDANE - An insecticide and the Gamma isomer of benzene hexachloride. Used for control of some household insects, plant feeding insects and animal parasite control.
HUMAN TOXICITY: Moderate.
- MALATHION - An organic phosphate insecticide for use in control of garden insects, household pests, and external parasites on cattle.
HUMAN TOXICITY: Moderately low.
- MEDIAN LETHAL DOSE - See LD₅₀
- METALDEHYDE - A component of slug and snail baits that acts as both an attractant and toxicant.
- METHOXYCHLOR - A chlorinated hydrocarbon insecticide for use in control of vegetable insects, plant feeding insects and livestock parasites.
HUMAN TOXICITY: Low.
- METHYL BROMIDE - A commercial fumigant used in warehouses, ships, and elevators.
HUMAN TOXICITY: High, avoid breathing toxic vapors.
- METHYL PARATHION - An organic phosphate insecticide for use on cotton and field crop pests.
HUMAN TOXICITY: Very high.

MEVINPHOS - An organic phosphate insecticide and miticide used to control plant feeding insects.
HUMAN TOXICITY: Very high.
Also, (PHOSDRIN)

MIREX - A chlorinated insecticide used principally in bait formulations for Imported Fire Ant control in the southeast United States.
HUMAN TOXICITY: Moderately high.

MOCAP - An organic phosphorus nematicide-soil insecticide usually applied as a granules.
HUMAN TOXICITY: High.

NALED - An organic phosphate insecticide in liquid or dust form, for control of flies, mosquitoes, and vegetable insects.
HUMAN TOXICITY: Moderate.
Also, (DIBROM)

NEGUVON - See TRICHLORFON.

NICOTINE - Also known as Nicotine Sulfate. Used in the control of aphids and sucking insects as a contact insecticide. Other chemicals now more widely used.
HUMAN TOXICITY: High.

NIRAN - Trade name for ethyl parathion. Used as a soil insecticide for control of corn rootworms.
HUMAN TOXICITY: High.

NORBROMIDE - A rodenticide that kills rats by vasoconstriction. Specific for rats and ineffective against mice or other rodents. Dispensed as a grain bait or aerosol foam.
Also, (RATICATE)

ORAL TOXICITY - The amount of a given toxic material given by mouth to a series of test animals to kill a specified number (usually 50%) of that test population.

PAM - (2 PAM) is a medical antidote for organic phosphate insecticides.
Also, (PROTOPAM)

PARADICHLOROBENZENE (PDB) - A weak fumigant and repellent used to control clothes moth and carpet beetle.
HUMAN TOXICITY: Low.

PARATHION - An organic Phosphate insecticide used widely on many crops for control of numerous insect species.
HUMAN TOXICITY: Extremely high.

PDB - See PARADICHLOROBENZENE.

PENTACHLOROPHENOL - Used as insecticide for control of termites and powder post beetles. Wood impregnated with penta is highly resistant to attack by fungi and insects.
HUMAN TOXICITY: Moderately high.

PERTHANE - A chlorinated hydrocarbon insecticide similar to METHOXYCHLOR.
Used mostly in aerosol bombs.
HUMAN TOXICITY: Low.

PERSISTENT PESTICIDE - The ability of a pesticide to remain after application.
Persistency is dependent on properties such as volatility and resistance to chemical breakdown.

PESTICIDE - A compound or mixture of chemicals, used to prevent, destroy, repel, or mitigate animals, plants, or organisms deemed to be pests.

PHORATE - An organic phosphate insecticide and miticide used on potatoes, wheat and cotton.
HUMAN TOXICITY: High.
Also, (THIMET)

PHOSPHAMIDON - An organic phosphate insecticide for use in control of aphids, mites, and beetles both as a systemic and contact insecticide.
HUMAN TOXICITY: Very high.

PHOSPHINE - Aluminum phosphide in tablet or pellet form which on contact with moisture releases hydrogen phosphide gas.
Also, (PHOSTOXIN)

PHYTOTOXIC - Materials which are poisonous to plants. Many insecticides may be efficient as insect killers, but cannot be used on crop plants because of their phytotoxicity.

PIPERONYL BUTOXIDE - A synthetic compound which increases the insecticidal properties of pyrethrins. Mixture is usually called (PYRENONE).

PPB - Symbol for "parts per billion".

PPM - Symbol for "parts per million".

PROLATE - See IMIDAN.

PROTOPAM - The drug prescribed as first-aid and therapeutic for treatment of accidental poisoning by organic phosphate and carbamate insecticides.

WARNING: PAM is antidotal and therapeutic, not a preventive.
Also, PROTOPAM CHLORIDE, PROTOPAM METHIODIDE, PAM.

PYRENONE - A pyrethrum synergized with either piperonyl butoxide or piperonyl cyclonene for use in fly and space sprays and as a grain protectant.
HUMAN TOXICITY: Very low.

PYRETHRINS - Pyrethrins I and II are main insecticide components of pyrethrum and esters of pyrethrolone, a ketonic alcohol.
HUMAN TOXICITY: Very low.

PYRETHRUM - A botanical insecticide used in fly and space sprays alone or with a synergist.
HUMAN TOXICITY: Very low.

REPELLENT - A material or mixture of materials which will cause an avoiding reaction in pests. Repellents need not kill to be effective.

RESIDUE - The amount of a pesticide remaining on a treated surface. An ILLEGAL RESIDUE would be the amount of a pesticide in excess of the amount prescribed by law.

RONNEL - An organic phosphate insecticide with contact and systemic action in controlling flies, and roaches as well as cattle grubs in livestock.
HUMAN TOXICITY: Moderately low.
Also, (KORLAN AND TROLENE)

ROTENONE - A plant derived insecticide used as dusts for garden insects, lice, ticks and grubs on animals.
HUMAN TOXICITY: Low.

RUELENE - An organic phosphate insecticide used to control internal and external parasites in livestock as a systemic.
HUMAN TOXICITY: Moderately low.

SCHRADAN - An organic phosphate insecticide and miticide used systemically in plants.
HUMAN TOXICITY: Very high.

SEVIN - See CARBARYL.

SODIUM FLUORIDE - An insecticide used in preparations for the control of cockroaches and poultry lice.
HUMAN TOXICITY: High.

SOIL INSECTICIDE - An insecticide applied that may be applied directly to soil for the control of soil inhabiting insects such as corn root-worm, white grubs, wireworms, cutworms and others.

SOLVENT - A material or mixture in which a toxicant may be dissolved or diluted to facilitate dilutions for application.

STICKER - A substance which increases the firmness of attachment of mixtures so as to offset the effects of time, wind, water, mechanical, or chemical action.

SULPHUR - Fungicide and acaricide. Effective in control of a variety of plant diseases; fleahoppers and mites.
HUMAN TOXICITY: Low.

SUSPENSION - Particles of a solid or liquid dispersed in a liquid but not dissolved in it.

SYNERGIST - Materials added to a formulation to increase its toxicity.

SYSTEMIC - (Insecticide) A compound which is capable of being traslocated through a plant or animal where it exhibits a toxicity to pests feeding on those parts which were not originally treated.

SYSTOX - See DEMETON.

TDE (DDD) - Chlorinated hydrocarbon insecticide related to DDT used to control leaf feeding insects. (DDD)
HUMAN TOXICITY: Low.

TEDION - A chlorinated miticide for fruits, vegetables and ornamentals.
HUMAN TOXICITY: Low.

TELODRIN - A chlorinated hydrocarbon of medium persistence.
HUMAN TOXICITY: High.

TEPP (Tetraethyl Pyrophosphate) - An organic phosphate insecticide used to control insects on commercial vegetable plantings soon to be harvested.
HUMAN TOXICITY: High.

TETRADIFON - See TEDION

THIMET - See PHORATE.

THIODAN - See ENOSULFAN

TOLERANCE - The trace amount of a pesticide permitted on processed or semi-processed food or feed products.

TOXAPHENE - A chlorinated hydrocarbon insecticide used against insect pests of field crops and some animal parasites.
HUMAN TOXICITY: High.

TOXICITY - The quality, state or degree of being poisonous.

TRICHLORFON - An organic phosphorus insecticide very effective against flies including resistant strains. Also effective for use against cockroaches, and other household and barnyard insects also certain soil pests. Used as baits or sprays.
HUMAN TOXICITY: Moderate.
Also, (DIPTEREX, DYLOX)

TROLENE - See RONNEL

ULTRA LOW VOLUME (also ULV) - Signifies that the total volume of spray to be applied per acre is one-half gallon or less and is to be applied undiluted.

VAPONA - See DICHLORVOS (DDVP)

VOLATILITY - The ability of a material to change from a solid or liquid to a gas at ordinary temperatures.

WARBEX - See FAMPHUR, also FAMOPHOS

WARF ANTIRESTANT - Used to overcome DDT resistance in house flies. Little or no insecticidal activity.

WEED - Any plant that grows where it is not wanted.

WETTABLE POSDER - A solid formulation which on addition to water forms a suspension for spraying. It is prepared by adding wetting agents to the formulation.

WETTING AGENTS - Substances which when added to surfaces, such as water and oil, increases the spreading and penetrating power by lowering surface tension. Detergents and soaps.

ZECTRAN - A carbamate insecticide used for foliage feeding insects and mites as well as snails, slugs, millipedes, and centipedes.
HUMAN TOXICITY: High.

